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The Editor will be glad to receive publications relating to Veterinary Science and cognate subjects in order that they may be dealt with in the *Veterinary Bulletin*.

Reports of Departments, Special Reports, reprints, etc., etc., should be sent as soon as they are issued.

Books for Review.

The Editor will be glad to receive books for review in the *Veterinary Bulletin*.

Bulletins on disease subjects written for farmers and "popular" articles of a similar nature are not included in the *Veterinary Bulletin*. Those of a sufficiently important nature, are, however, included in *Index Veterinarius*; so also are certain review articles, presidential addresses, congress proceedings, etc., where the title conveys as much information as could be given in an abstract of a few lines. For information of this nature, readers of the *Veterinary Bulletin* are referred to *Index Veterinarius*, where titles of all publications indexed by the bureau are fully cross-referenced.

IMPERIAL BUREAU OF ANIMAL HEALTH

THE

VETERINARY BULLETIN

Vol. 10.] **March, 1940.** [No. 3.

DISEASES CAUSED BY BACTERIA AND FUNGI

McIlwain, H., Fildes, P., Gladstone, G. P., & Knight, B. C. J. G. (1939). **Glutamine and the Growth of** *Streptococcus Haemolyticus.*—*Biochem. J.* **33.** 223-229. 4 tables. [10 refs.]

The work reported continues a study of the nutrients essential for the growth of bacteria. It has already been shown that " simple " non-pathogenic bacteria can obtain all the nitrogenous compounds required in their metabolism by synthesis from ammonia, but that increasing complexity of nutritional requirements, usually associated with greater pathogenicity, necessitates the provision of more complex nutrients, some of which have been identified with established animal vitamins. It is shown in the present paper that glutamine, a substance present in most animal tissues, but with no known function, is an " essential growth factor " for most strains of streptococci isolated from cases of disease, and that the well recognized importance of meat or meat extract, so far as the growth of haemolytic streptococci is concerned, is to ensure the presence of glutamine in the nutrients. Eleven strains, including the " Richards " strain, needed this substance, whilst two others did not. After a variable number of subcultures on agar a strain may however learn to grow without meat extract.—A. W. Stableforth.

I. Smith, M. L., & Price, S. A. (1938). **Staphylococcus β Haemolysin.**—*J. Path. Bact.* **47.** 261-377. 9 tables. [13 refs.]

II. Smith, M. L., & Price, S. A. (1938). **Staphylococcus γ Haemolysin.**—*Ibid.* **47.** 379-393. 9 tables. [11 refs.]

III. Packalén, T. (1938). **Observations on a Peculiar Type of Staphylococcal Haemolysis.**—*Acta path. microbiol. scand.* Suppl. No. 38. pp. 142-144. [In English].

I. This study deals with the β toxin first identified and described by Glenny and Stevens [*V. B.* **6.** 484]. Blood cells of the ox and sheep are much more susceptible to β lysis than blood cells of any other species, although late lysis of human and rabbit cells does occur. β toxin kills rabbits, after intravenous injection, usually in two hours and occasionally in 48 hours. Intradermally it produces erythema in rabbits. Formalin reduces the lytic and toxic power without reducing the antigenic activity.

A natural β antitoxin occurs in the serum of rabbits, g. pigs, sheep and man. The β antihaemolysin of sera is not appreciably reduced by heating at 65°C. for 2 hours.

It is considered unlikely that the flocculation reactions are due to specific precipitation of β toxin by antitoxin. Union of β toxin and antitoxin is slow and unstable, being dissociated by dilution. The influence of this on antitoxin assay is discussed. The presence of broth or glycerol accelerates β lysis so that in some cases it no longer shows the " hot-cold " characteristic. It cannot, therefore, be assumed that the early lysis of sheep cells by this toxin is due to the α type. Some culture filtrates contain a heat-stable substance which delays and also inhibits the lysis of sheep cells by β toxin. It is thought that the β lysis produced by different strains is identical, and also that the factors causing hot-cold lysis of sheep red cells, dermal erythema, and toxic effects in rabbits are the same. The α component should be neutralized before assaying the β toxin content of serum.

II. The authors studied a strain of staphylococcus that was pathogenic for mice and produced haemolysis on sheep and rabbit blood agar plates. It produced a β and a " γ haemolysin "; the latter was distinct from both α and β haemolysins. γ haemolysin is heat labile and produces an early haemolysis of the red cells of all species investigated ; this haemolysis is sometimes increased from six to twelve times on standing at room temperature. It can be specifically neutralized, and is slightly dermonecrotic. It has some toxicity for rabbits, but not for g. pigs or mice. Formalin reduces its haemolytic, but not its antigenic power. In all species studied normal sera contained γ antibodies. Guinea-pigs and rabbits were artificially immunized with γ haemolysin and in the latter there was some evidence that this increased immunity to the intravenous injection of staphylococci.

A strain D4, supplied by MINETT [*V. B.* **6.** 570], produced a β toxin and a rabbit cell lysin immunologically distinct from α or γ lysin. γ lysis may be related to the α_2 lysis of MORGAN and CRAYDON [*V. B.* **7.** 288].

The effect of β and γ lysins on α antitoxic assay and their role in human infections is discussed.

III. If incubated for several days on certain types of blood agar plates (not ox blood), *Staph. aureus* may produce satellite haemolytic zones. For the development of these zones serum or serum substitute is necessary, but sera of animals whose own blood does not show that satellite haemolysis is active. The serum is inactivated at 55°C. for 10-60 minutes as well as by chemical means. The active principle is precipitated with the globulins, but is not identical with complement. The phenomenon is also observed under the following conditions :- (1) in using haemolysed blood, (2) in replacing blood by ascitic fluid made opalescent by heating, (3) if the basic agar is replaced by tragacanth or Loeffler serum and (4) with Loeffler serum plates activated by fresh serum or plates with pure ox serum coagulated by heating. In the latter cases the satellite phenomenon is exhibited by a zone of clearing on an otherwise opaque medium.—JOHN FRANCIS.

FERRIOLS, V., GABRIEL, G. L. S., & CORONEL, A. B. (1939). **Report of the Special Committee on Anthrax [Philippine Veterinary Medical Association].**—*Philipp. J. anim. Indust.* **6.** 151-155.

The policy adopted in the Philippines with regard to anthrax is to determine all the regions in which the disease is endemic and to administer therein free mass vaccination until losses are reduced to a minimum. In addition, the animals in infected areas are subjected to strict quarantine and proper disposal of carcasses by deep burial is enforced. The opening of carcasses of animals suspected of having died of anthrax is prohibited, and cutting is limited to the minimum necessary for securing blood samples for diagnosis. Since 1936 a spore vaccine with saponin has been found to be adaptable to local conditions.—D. D. OGILVIE.

PLUM, N. (1937). **Studies on Tuberculosis and Tuberculin Reactions in Cattle.** —*Skand. VetTidskr.* **27.** 589-685. 9 figs., 21 tables. [In English : Swedish summary]. [Also appeared in *Maanedsskr. Dyrlaeg.* **49.** 449].

This is a record of many years' work on tuberculin testing and contains so many points of importance that it should be read in the original. The main subjects investigated may be summarized as follows :–

(1). *Duration of reactibility to repeated intradermal testing.* Three separate herd tests were carried out, in which numbers of animals were tested weekly for from 8-15 weeks in succession. Roughly speaking, the reactibility diminished during the period, but not strikingly.

(2). *Cause of the tendency towards loss of reactibility after repeated intradermal testing.* Tests were made on two herds in which cows were injected weekly with 0·5 or 1·0 c.c. of tuberculin divided into five portions which were injected at various sites simultaneously. There was a more marked fall in reactibility in one herd than in the other, but the reason was not ascertained.

(3). *Whether a subcutaneous injection of tuberculin removes the reactibility to the intradermal test.* Groups of tuberculous cattle in three herds were given massive doses of tuberculin subcutaneously (10 c.c. or 20 c.c.) or intravenously (20 c.c.) on three successive days, and were tested intradermally about four days later. In all cases the reactibility had been almost entirely lost.

(4). *Tuberculin reactions due to avian type infection in cattle.* In Denmark doubtful reactors are in certain circumstances retested with bovine and avian tuberculin simultaneously. A greater reaction to the latter indicates that the animal is not infected with bovine type TB. It is, however, much more difficult to detect cattle infected with the avian type bacillus, as cattle also react to it when affected with Johne's disease or so-called " skin lesions ". In practice the repeat test with both tuberculins is sometimes very difficult to judge ; research was then carried out on other methods. The subcutaneous test with bovine tuberculin was applied to cattle known to have the avian type infection, and an average of 50% reacted ; it was, therefore, of no value for differentiation. Similar tests with the ophthalmic test with bovine tuberculin gave negative reactions, but no opinion on the value of this method is given. Another differentiation method tried was repeated simultaneous tests with falling doses of bovine and avian tuberculins intradermally. This often gave clear results, but not always, so that it was not sufficiently reliable for general use. The double intradermal method was also tried in cattle which had given doubtful results to single injections of bovine and avian tuberculin, but it did not help to differentiate the type of infection.

(5). *Experimental avian type infection in cattle.* It is known that cattle with bovine type TB. react to bovine and to avian tuberculin in intensities of the order of 4:1. The effect of adding (perorally) an avian type infection to such animals was studied by infecting five groups totalling 30 cattle with one to five doses of culture of avian bacilli. The reactibility ratio fell from 4:1 to about 2:1 ; thus, a massive infection with avian bacilli did not upset the tuberculin test in animals already affected with bovine type TB.

In a second experiment, avian type infection was transmitted to 32 non-tuberculous cattle which were tested with both types of tuberculin repeatedly. Although reactions were obtained with bovine tuberculin, they did not persist long, whilst reactions to avian tuberculin were always much stronger and the reactibility persisted for some time.

(6). *Double infection with bovine and avian bacilli.* Experience with a large herd of cattle divided into clean and reacting sections, in which cattle in the clean

section began to react, is described. It transpired that a few of the new reactors were actually infected by the bovine bacillus and the rest by the avian bacillus.

(7). *Variations in reactions over periods of time.* P. discusses this matter with reference to the data obtained in experiments referred to above. He found that an initial tuberculin test tends to desensitize the animal to a second test, but the reason for this is obscure; variation in the tuberculin used did not appear to play any part.

(8). *Determination of the type of infection.* P. summarizes in tabular form the results of diffierentiation tests of 170 cases based on tuberculin, culture and g. pig inoculation tests. The original must be seen to appreciate the methods and conclusions. It is interesting to note that avian type infection was responsible for lesions in 2 out of 48 specimens of bronchial lymph node, in 3 out of 17 mediastinal lymph nodes, in 5 out of 15 retropharyngeal lymph nodes and in 35 out of 48 mesenteric lymph nodes.—J. E.

STENIUS, R. (1938). **Differentiation by Tuberculin Testing of Infection in Cattle due to the Human, Bovine and Avian Types of Tubercle Bacilli.**—*Vet. Rec.* **50.** 633-637. 1 table.

Discrepancies between the results of tuberculin tests in the field and the naked eye findings at P.M. examination in the abattoir led to investigations into the interpretation of the tuberculin test in Finnish cattle. From limited experimental and extensive epidemiological evidence, it was claimed that cattle regularly cared for by human beings affected with open TB. tend to contract infection with the human type of bacillus and to react to bovine and other types of tuberculin. Using this as a working hypothesis, S. explains how such reactions are recognized in practice. The differentiation is chiefly accomplished by the use of the subcutaneous and repeated intradermal tests on the herd in question. The cattle are not visibly affected by these human type infections and recover in a relatively short time. In conclusion, reference is made to the problem of avian type TB. in cattle, and its elucidation along the lines worked out by PLUM [see preceding abstract].—GEOFFREY B. BROOK.

LUCAS, A. P. (1938). Prophylaxie de la tuberclose des races bovines laitières. **[Control of TB. in Dairy Cattle in Portugal].**—*Bol. pec., Lisboa.* **6.** 23-50. 9 figs., 4 tables, 4 maps, 2 graphs, 1 plan. [In French].

A brief historical review is given of prophylactic measures against bovine tuberculosis in Portugal. Abattoir statistics have proved useful in determining the distribution of the disease.

Tuberculin testing is carried out by units of veterinary officers and lay assistants. Animals are identified by branding on the horns a number and a letter indicating the area. A standard tuberculin is used, a single injection being given in the caudal fold.

Tested zones are being established. In 1937, 20,879 cattle were tested and there were 599 reactors, which were slaughtered. Movement into the tested zones is allowed on permit. With the extension of the areas a marked fall in the percentage of reactors has occurred.

Near Lisbon there is a heavily infected area where these methods are not practicable. Here clinical cases are slaughtered, compensation being paid on a dead weight basis, and an attempt is made to isolate reactors to the tuberculin test. Movement is only permitted by permit and then not to free areas; calves from reactors are separated at birth.

Statistics are given indicating the distribution of lesions in slaughtered cattle and the age incidence of the disease.—F. H. MANLEY.

I. Venema, H. (1938). Tuberculose-bestrijding. [**On Bovine TB. Control in Holland**].—*Tijdschr. Diergeneesk.* **65.** 1209-1212.

II. Beiejrs, J. A. (1938). Tuberculose-bestrijding. (Naar aanleiding van vorenstaand artikel) [*Tijdschr. Diergeneesk.* **65.** 1209]. [**On Bovine TB. Control in Holland**].—*Ibid.* 1213-1217.

I. V. considered that the control of TB. in Holland was unsatisfactory. For a well-organized plan he considered the following to be necessary :- (1) compulsory participation by all farmers ; (2) compulsory separation of negative and positive tuberculin test reactors ; (3) the immediate slaughtering of animals with open TB. ; (4) the compulsory rearing of young animals so as to render them free from infection ; (5) an annual intradermal tuberculin test ; (6) increased facilities for getting rid of reactors ; (7) those farmers who have to eliminate animals should be allowed to raise more calves [than generally allowed at present in Holland] ; (8) the use of BCG vaccination on heavily contaminated farms ; (9) centralization of the organization under the direction of a veterinarian, and (10) punishment for breaches of the regulations. He also emphasized the need for co-operation between the medical and veterinary professions over those aspects of TB. which are important to both.

II. B. criticises Venema's opinion in I. He too considers co-operation with the medical profession advisable, not only to combat bovine TB. in man, but also to prevent cases of human TB. in cattle. Instead of compulsory participation, B. advocates control of the disease only where the co-operation of the owner is to be expected. He suggests waiting until more is known about the intradermal test before introducing it. He supports the use of BCG vaccination on heavily infected farms. He is satisfied with the results obtained up to the present ; *e.g.* in the district of Utrecht the proportion of reacting animals was 32·6 % in 1934 ; 30·9 % in 1935 ; 38·7 % in 1936 ; 23·7 % in 1937, and 20·9 % in 1939.

In spite of his criticisms, B. realises that on many farms with insufficient isolation facilities no progress is being obtained. He too, therefore, desires reorganization.—Jac. Jansen (Utrecht).

Markevičius, A. (1937). Ar galima musu sąlygomis sekmingesne kova su galviju tuberkuloze ? [**Possibilities of Control of Bovine TB. in Lithuania**].—*Vet. ir Zootech., Kovno.* **14.** 174-179.

Control measures for bovine TB. in Lithuania consisted of a combination of the Bang and Ostertag methods with the voluntary slaughter of affected cattle. Bang's method demands a great deal from the owners, is difficult in execution, and is stated to be less successful than Ostertag's method. M. recommends the combating of TB. by compulsory culling of affected animals, using the tuberculin test ; this method would be possible provided it were not employed simultaneously in all parts of the country, but in each district in turn. He considers that seven or eight veterinarians would be needed for the work.—A. Pabijanskas (Kaunas).

Jansen, J. (1938). Over de virulentie van den tuberkelbacil der primaire infectie bij het phenomeen van Koch. [**Virulence of Tubercle Bacilli of Primary Infection in Koch's Phenomenon**].—*Tijdschr. Diergeneesk.* **65.** 1218-1225. [English, French and German summaries].

J. wished to discover whether Koch's phenomenon would occur if the second infection consisted of bacilli which were already adapted to the system of the patient.

The following experiment was carried out.

From three chronically tuberculous g. pigs the infected right inguinal lymph

nodes were excised. The same three g. pigs were injected subcutaneously in the left hind leg with a suspension of these organs, and three healthy control animals were injected in the same way. The control g. pigs became infected, but in the three infected g. pigs the corresponding lymph nodes on the left side remained unaffected. These negative reactions comply with Koch's phenomenon. The conclusion is drawn that the appearance of this phenomenon is, therefore, not dependent on whether the tubercle bacillus is adapted to the body or not.

KAMIL, S., & BILAL, S. (1938). Recherches expérimentales sur l'étiologie de la tularémie en Turquie. [**Tularaemia in Turkey**].—*Ann. Parasit. hum. comp.* **16.** 530-542. 1 fig. [8 refs.]

In an investigation of the aetiology of tularaemia in Turkey, many wild and domestic animals and birds as well as laboratory animals were found to be susceptible to experimental infection. The infectivity of the bile and urine of affected animals indicated the probability of spread of the disease by contamination of drinking water. Experimental transmission of the disease by bed bugs and ticks proved successful in g. pigs. Intradermal and serological tests and inoculation of mice with purulent lymph nodes were employed for diagnosis. In a study of the biological characters of twelve *Bact. tularense* strains, vaccination of twelve g. pigs with a live avirulent strain conferred some resistance but no immunity to infection with a virulent strain. No resistance to infection was produced by dead vaccine or by sero- and chemotherapy.—R. O. MUIR.

HARMS, F. (1939). Hämorrhagische Septikämie bei Katzen. [**Haemorrhagic Septicaemia in Cats**].—*Dtsch. tierärztl. Wschr.* **47.** 436-437. [3 refs.]

P.M. examination of a cat showed the cause of death to be haemorrhagic septicaemia. The pathological findings were fibro-purulent pneumonia and pleurisy, slight enlargement of the liver and spleen, and slight catarrhal gastro-enteritis, *i.e.* a condition commonly found in infection with this organism in other species known to be susceptible to this disease.

Microscopic examination of material from this cat and culture proved the presence of *Pasteurella septica*. Bacteria thus cultivated were capable of inducing a lethal infection in rabbits, g. pigs and mice with the characteristic symptoms of pasteurella infection. Three other cats had died of a similar condition in the same cattery and two more had contracted the disease. Hence H. concludes that cats are also susceptible to pasteurellosis of an epizootic character.

MATZKE, Martha. (1938). Untersuchungen über Bakterienträger bei der Geflügelcholera. [**Carriers of Infection in Fowl Cholera**].—*Inaug. Diss., Berlin.* pp. 52. 1 table. [Numerous refs.]

M. examined 150 fowls, none of which had shown any clinical symptoms or pathological signs of fowl cholera.

Bacteriological examination showed that 5 (3·3%) of the birds were genuine carriers, a circumstance which M. regards as a possible explanation of the sudden outbreaks of fowl cholera observed in poultry shipments or at poultry shows. She also believes that the occurrence of isolated cases of fowl cholera in a healthy fowl population may be due to the same cause, *i.e.* some lesion, by lowering the resistance of a bird, may permit the bacillus to exercise a pathogenic influence.

BIESTER, H. E., & SCHWARTE, L. H. (1939). **Studies on Listerella Infection in Sheep.**—*J. infect. Dis.* **64.** 135-144. 8 figs., 5 tables. [9 refs.]

An account is given of two field outbreaks, involving 266 lambs, of a febrile

disease characterized by disturbance of the central nervous system. The histopathology of the brain and spinal cord demonstrated a poliomyelitis. Repeated transmission attempts with filtered tissue suspensions showed that the disease was not due to a virus. Inoculation of large amounts of finely-dispersed infected brain suspensions on to agar and liver infusion agar slopes yielded pure cultures of a *Listerella*. The disease was reproduced in sheep and pigs by intracerebral inoculation or by repeated subcutaneous or intramuscular injections of *Listerella* cultures, though pigs proved more resistant than sheep. The disease was most consistently diagnosed by recovery of the causative bacillus from rabbit brains after intracerebral injection with brain suspension from affected sheep. The organism remained viable for several months in brain tissue stored in the ice-chest in sterile neutral 50% glycerin. [See also *V. B.* **8.** 73, 415].—R. O. Muir.

Hindmarsh, W. L., Stewart, D. F., & Hart, L. (1939). **Swine Dysentery and Salmonella.**—*Aust. vet. J.* **15.** 27-30. [4 refs.]

Investigations have been made into a disease of pigs in New South Wales which appears to be identical with that referred to in the U.S.A. as swine dysentery [*V. B.* **6.** 879]. The lesions are those of a necrotic enteritis and the first deaths investigated were thought to be due to a salmonella infection. However, such an organism was recovered from only four out of sixteen natural cases; this was found to be *S. cholerae-suis* var. *kunzendorf*. Since Salmonella infection is enzootic in most pig communities the authors tested for the presence of agglutinins both the sera of pigs affected with or recovered from swine dysentery, and also the sera of pigs experimentally infected. *S. cholerae-suis* var. *kunzendorf*, which is the only one so far identified with pigs in New South Wales, was selected for the tests.

The serological evidence presented indicated that the disease was not due to *S. cholerae-suis* var. *kunzendorf*.—H. B. Carter.

Hajdu, G. (1936). Adatok a lóbrucellosis elterjedtségéhez hazánkban. [**Brucella Infection in Horses in Hungary**].—*Thesis, Budapest.* pp. 19. [Numerous refs.] [German summary].

Agglutination and complement-fixation tests on 1,030 samples of horse blood were positive in seven cases and doubtful in two. In one of these nine horses there were no clinical symptoms; of the others, two had fistulous withers, one had poll-evil and one, chronic arthritis of the fetlock joint. In addition, there was a history of abortion in four of the horses, accompanied by pectoral abscess in one case. Bacteriological examination of the diseased tissue of affected horses failed to reveal brucella in any case. According to the case histories, however, the affected horses all had the opportunity of becoming infected.—G. Sályi (Budapest).

Pavlov, P. (1938). La brucellose chez les volailles. [**Brucellosis in Poultry**].—*Rec. Méd. vét.* **114.** 790-798. [15 refs.]

P. describes experiments performed on pigeons and fowls with cultures of *Br. abortus* and *Br. melitensis* of bovine origin maintained at the Pasteur Institute. 24 pigeons infected by intravenous, intramuscular and subcutaneous inoculation were placed with 10 controls and 10 healthy g. pigs. The pigeons did not react to intradermal tuberculin tests. Agglutination reactions were positive in the case of one pigeon inoculated intramuscularly and one inoculated intravenously. Two of the g. pigs reacted to a low titre. 12 fowls similarly inoculated were placed with 3 controls and 7 healthy rabbits and 10 healthy g. pigs. The control fowls and also the g. pigs remained negative to agglutination tests. The rabbits became

positive to a high titre. The rabbits gave positive intradermal reactions; 5 died in the three months following inoculation and gave positive cultures. The inoculated fowls later gave intradermal reactions with a maximum reaction at 24 hours. None of the birds showed clinical symptoms. Cultures from spleen and bone-marrow of infected pigeons killed after 22 days were positive; cultures from pigeons killed after 70 days were negative. In general birds are more resistant to infection than mammals. Fowls' eggs which were inoculated with large doses of brucella were found to contain the organisms from 4-14 days after infection.—S. J. GILBERT.

ROLLE, M. (1938). Ueber die Bekämpfung der Brucellose. [**Control of Brucella Infection**].—*III. Balti. Valsty. vet. Kongr. Protokol. 1937.* pp. 48-50. [In German].

R. describes the eradication of *Br. abortus* infection from a herd in the course of five years by isolating the new-born calves and young stock from the affected animals, and inoculating the young stock with non-virulent live vaccine before returning them to the infected herd. A further precaution was the immediate slaughter of all animals found to be actively excreting the organisms in their milk and discharges. He urges that all suspicious cases of contagious abortion in cattle should be made notifiable to the competent authorities.

PRÉVOT, A. R. (1938). Études de systématique bactérienne. III. Invalidité du genre *Bacteroides* Castellani et Chalmers. Démembrement et reclassification. IV. Critique de la conception actuelle du genre *Clostridium*. [**Bacterial Nomenclature. III. Invalidity of the Genus Bacteroides Castellani and Chalmers. Reclassification. IV. Critique of the Modern Conception of the Genus** *Clostridium*].—*Ann. Inst. Pasteur.* **60.** 285-307. **61.** 72-91. 2 tables. [Numerous refs.]

III. P. opposes the introduction of the generic name *Bacteroides* suggested by Castellani and Chalmers to include all non-sporulating strict anaerobes, because the only common characteristic, that of obligatory anaerobiosis, is far outweighed by differences which exist between such organisms as *Actinomyces bovis* and *Fusiformis necrophorus*. In his opinion a natural classification along the following lines should be adopted :–

Order.	Family.	Well-known genus recognized as pathogenic.
Bacteriales	Ristellaceae	*Pasteurella*
	Bacteriaceae	—
Actinomycetales	Actinomycetaceae	*Actinobacterium* (*i.e. Actinomyces*) *Corynebacterium.*

Naturally numerous genera not mentioned in the above table are also named, together with the constituent species and the characteristics which distinguish one from another. [P. gives the impression in this article that the classification of micro-organisms is simple provided the differential characters mentioned are noted. In the abstractor's experience attempts to classify unknown organisms upon their shape and their action in a few test media such as litmus milk, gelatin, or solid serum have always failed dismally, and in his opinion a classification purporting to be as comprehensive as this one and yet so lacking in supporting experimental data should be considered with great reserve].

IV. P. claims that the present constitution of the genus *Clostridium* is unjustified, since the inclusion in one genus of all sporulating anaerobic bacilli results in an enormous aggregation of completely unrelated organisms. He advocates an

alternative classification in which a family Clostridiaceae of the sub-order Clostridiales is envisaged, divided into three genera, *viz*, *Inflabilis*, including non-motile members, *Clostridium*, incorporating the motile ones, and *Welchia*, for capsulated types. The tetanus bacillus and related forms would be removed to an entirely different sub-order Plectridiales. [Whilst one is inclined to agree with the general contention that the inclusion of organisms as different as *Cl. butyricum*, *Cl. tetani* and *Cl. welchii* in a single genus is clumsy and misleading, P's explanation of his own classification is not sufficiently convincing to justify its universal adoption]. —E. J. Pullinger.

Findlay, G. M., Mackenzie, R. D., MacCallum, F. O., & Klieneberger, Emmy. (1939). **The Aetiology of Polyarthritis in the Rat.**—*Lancet.* **237.** 7-10. [Numerous refs.]

After reviewing the literature on the subject, the investigation of a spontaneous polyarthritis in rats in London is described. The disease has been shown to be infectious, and a pleuropneumonia-like organism, provisionally termed L7, has been isolated and demonstrated to be the causal agent of this disease. The relationship of the above-mentioned organism to other pleuropneumonia-like organisms is discussed. This disease is transmissible to mice.—S. G. Iyer.

Riet, J. (1938). Neumonicosis aspergilar o aspergilosis pulmonar de los pollitos. Su constatacion en el Uruguay. [**Pulmonary Aspergillosis in Fowls in Uruguay**].—*An. Fac. Vet., Montevideo.* No. 4. pp. 339-349. 6 figs. [4 refs.]

At P.M. examination of five chicks, dead after five days illness, greyish nodules were found in the lung substance and on the surface, the largest being about 2 mm. in diameter. There was acute pleuritis, but there were no other lesions in the body. Crushed nodules contained filaments, and these were also found in other parts of the lung substance.

Growth of a pathogenic aspergillus was obtained readily on the usual media. —A. H. Hunter.

DISEASES CAUSED BY PROTOZOAN PARASITES

Sarwar, S. M. (1937). **The Control of Bovine Surra with Special Reference to Possible Vectors.**—*Proc. Anim. Husb. Res. Wkrs Conf. India, 1936.* pp. 45-49. Discussion pp. 49-51.

S. reviews the Indian literature on surra in India, and gives a general account of the disease and its drug treatment. He states that the following flies have been incriminated as vectors,—*Stomoxys*, *Lyperosia*, *Eumarus*, and *Bdellolarynx*.

In the discussion Taylor stated that it was difficult to correlate the increase of biting flies in the rains with the acute onset of the disease. In small herds control by the use of naganol was possible, but its use was not practicable owing to economic considerations. He favoured the use of the cheaper antimony compounds ; fatty degeneration does not take place until after a long course of tartar emetic has been administered. After heavy rains either the virulence of the parasite is increased or the animals' resistance is lowered.

Several speakers mentioned the efficacy of tartar emetic for the treatment of infected animals. Pandey stated that in Assam overwork and proximity to a tabanid-infested zone were the main features noted in investigating an outbreak of surra.—J. A. Griffiths.

VAN DEN BRANDEN, F. (1938). Examens comparatifs du sang de la moelle osseuse des rats blancs infectés de *Trypanosoma brucei*. [**Examination of the Blood and Bone-Marrow of White Rats Infected with** *Tryp. brucei*].—*Ann. Soc. belge Méd. trop.* **18.** 139-142. [1 ref.]

Simultaneous examinations of the bone marrow and blood of 25 white rats infected with *Tryp. brucei* revealed parasites in the marrow in only two cases, although they were present in all cases in the blood. The marrow was derived from long bones, as insufficient material was obtainable for examination by sternal puncture. Previous workers have reported the constant presence of *Tryp. gambiense* in the bone-marrow of infected g. pigs [*V. B.* **8.** 140.], but the author does not consider that it has the same practical application in rats infected with *Tryp. brucei* as is claimed for human trypanosomiasis.—M. L. BINGHAM.

I. KLEINE, F. K. (1936). **Remarks on Sleeping Sickness.**—*J. S. Afr. vet. med. Ass.* **7.** 204-210.

II. CASTELLANI, A. (1939). **Comment on a Paper by Prof. F. K. Kleine [on Sleeping Sickness in** *J. S. Afr. vet. med. Ass.* **7.** 204. (1936)]. [**Correspondence**].—*Ibid.* **10.** 35-47.

I. K. refers to many interesting features of his investigations on sleeping sickness in central Africa since 1906. He considers that BRUCE was the real discoverer of the cause of sleeping sickness as CASTELLANI did not realize the import of the presence of trypanosomes in his patients until BRUCE pointed it out to him. His experiments on the development of trypanosomes in tsetse flies are recalled and mention is made of the work of TANTE to prove the non-infectivity of *Tryp. brucei* for man by inoculation of himself and 100 natives. Reference is made to the incorrect observation of KINGHORN and YORKE that as much as 16% of game in Northern Rhodesia were infected with *T. rhodesiense*. The article is mainly historical in nature.

II. In a letter addressed to the editor of the Journal of the South African Veterinary Medical Association C. claims that Kleine's history of the elucidation of the aetiology of sleeping sickness [see I] is completely incorrect. He quotes a letter of his own from Entebbe in 1903 suggesting that the trypanosome he had found in the cerebrospinal fluid of patients with sleeping sickness had an aetiological significance. Many other authorities are quoted who refer to him as the discoverer of the aetiology of sleeping sickness.—E. M. ROBINSON.

RAOULT, A. (1938). La coloration du suc ganglionnaire dans la recherche du trypanosome en équipe de prospection. [**The Staining of Gland Juice in the Search for Trypanosomes by Itinerant Missions**].—*Ann. Méd. Pharm. colon.* **36.** 126-137. [Abst. from abst. in *Trop. Dis. Bull.* **35.** 703].

A comparison, based on thousands of tests, of the reliability of blood smears and smears of superficial lymph node juice for the diagnosis of human trypanosomiasis. The conclusion is drawn that the thick blood smear method is the better for diagnosis, being much more reliable than lymph node smears.—J. E.

KOLODNY, M. H. (1939). **Studies on Age Resistance against Trypanosome Infections. V. The Influence of the Age of the Rat upon Experimental Infection with** *Trypanosoma cruzi* **per os.**—*Amer. J. Hyg.* Sect. C. **29.** 155-161. 2 tables. [14 refs.]

Since many workers have shown that rats can be infected by metacyclic forms of *T. lewisi* and *T. cruzi* given *per os*, it is of interest to note that K. found that young rats up to 12 days were regularly susceptible to infection *per os* with

blood forms of *T. cruzi*. Occasionally rats up to 20 days old could be infected, but older animals were always insusceptible. The infection so produced was milder, more prolonged, and less frequently fatal than in young rats intraperitoneally infected, and was more severe in very young animals orally infected than in slightly older animals infected by the same route. [See also *V. B.* **9.** 693].—M. L. B.

Kolodny, M. H. (1939). **The Transmission of Immunity in Experimental Trypanosomiasis** (*Trypanosoma cruzi*) **from Mother Rats to their Offspring.** —*Amer. J. Hyg.* Sect. C. **30.** 19-39. 8 tables. [17 refs.]

Records of numerous experiments, demonstrating many aspects of immunity to *T. cruzi* infection in rats, reveal that antibodies are transferable to young rats born of actively and passively immunized mothers. The immunity is conferred *via* the colostrum and milk, there being little or no evidence of placental transference of antibodies, although rats have a deciduate placenta; antibodies are demonstrable in the sera of immune mothers and of immune and normal young suckled by them, but not in the sera of immune young suckled by normal mothers. Antibodies are also demonstrable in the milk for at least 20 days *post partum* and probably longer, and the resulting immunity in nurslings, though temporary and incomplete, is of a high degree and is specific. Various factors may modify the degree of immunity, *e.g.* the intensity of infection of the mother, the time interval between her recovery and the birth of the young, and the number of young in the litter.—M. L. Bingham.

I. Pop, A., & Ogneru, D. (1937). Recherches sur la trichomonose bovine chez les vaches sacrifiées à l'abattoir municipal de Bucarest. [**Trichomonas Infection in Cattle Slaughtered at Bucharest**].—*Arhiva vet.* **29.** No. 5. 12-25. 1 fig. [Numerous refs.] [In French: German summary].

II. Uhlenhaut, F. A. (1937). Beitrag zur Verhütung der Trichomonadenseuche. [**Prevention of Trichomonas Infection in Cattle**].—*Inaug. Diss., Munich.* pp. 40. 5 figs., 2 tables. [Numerous refs.]

III. Abelein, R. (1938). Behandlung von Bullen mit Trichomonaden. [**Treatment of Trichomonas Infected Bulls**].—*Dtsch. tierärztl. Wschr.* **46.** 721-724. 2 figs.

IV. Swangard, W. M. (1938). **Control of Trichomoniasis in Cattle.**—*Vet. J.* **94.** 446-453. [10 refs.]

I. 273 cows slaughtered at the Bucharest abattoir were examined, and out of 15 cases of pyometra *Trichomonas genitalis* was found in 9. In 5 cases it was associated with *Bact. coli*, staphylococci and streptococci, and was found in pure culture in 4 cases. No parasite was found in the uteri of healthy animals or in young animals from one to two years old.

II. U. advocates cure by medication of the uterus and vagina of the cow and of the sheath of the bull.

III. Various strengths of trypaflavine and bovoflavine were investigated. The best results were obtained with 0·5% "bovoflavin" ointment and 0·1% trypaflavine solution. The bulls were cast and treated under epidural anaesthesia induced by 2% tutocain solution, so that with relaxation of the involuntary muscles the drug could be properly introduced.

IV. S. gives a description of the symptoms, lesions and diagnosis of the condition. Measures of control include separating the herd into three groups:– A, non-infected cows and virgin heifers; B, pregnant cows, and C, infected cows, those with pyometra or other symptoms of the disease, and the infected male or males. Group A may be served by an uninfected bull, group B is kept under

observation for potential pyometra cases, while group C receives treatment. Treatment begins with enucleation of the corpus luteum, and during the next few days vaginal douches with a 2-5% solution of sodium perborate are recommended. After this 100 c.c. of a 1% aqueous solution of iodine is injected through the cervix. In enucleation of the corpus luteum S. states that a mortality rate of 2% should be reckoned with. [This operation should not be lightly undertaken. The reader is referred to an abstract with editorial comment which appeared in the *Veterinary Record* (1939). **51.** 1349.—Ed.].—A. L. Wilson.

Schoop, G., & Oehlkers, H. (1939). Die Züchtung der Rindertrichomonaden in eiweissarmen Nährboden. [**Cultivation of Bovine Trichomonads on Protein-Weak Media**].—*Dtsch. tierärztl. Wschr.* **47.** 401-403. 2 figs. [Numerous refs.]

Experiments were carried out on the cultivation of trichomonads with a medium containing a minimum of protein, since their growth is hindered by the development of bacteria in the cultures. The medium consisted of salt solution, a solution of primary and secondary calcium phosphates, water, bovine serum and a small amount of rice flour. Incubation was at room temperature and with this medium contamination with bacteria was reduced to a minimum.—A. L. Wilson.

Nelson, Phyllis M. (1938). **Cultivation of *Trichomonas foetus* in the Chick Embryo.**—*Proc. Soc. exp. Biol., N.Y.* **39.** 258-259. [3 refs.]

T. foetus was passaged twice by intraperitoneal injection into g. pigs and isolated from the second g. pig in pure culture. The chorio-allantoic membranes of chick embryos 11-12 days old were exposed and sterile air forced into the allantoic cavity through an artificial opening to make the membrane adhere to the edges of the shell opening. Transfers were made 3-4 days after inoculation if large numbers of living trichomonads were found on microscopical examination. The experiments were continued through fourteen generations.—S. J. Gilbert.

Schaaf, J., & Scherle, H. (1938). Ueber das Vorkommen von Trichomonaden beim Huhn. [**Trichomonads in Fowls**].—*Zbl. Bakt. I.* (*Orig.*). **141.** 305-309. [A short version appeared in *Tierärztl. Mitt.* **19.** 942].

The authors carried out investigations on 400 healthy and 418 infected hens, and found that, contrary to experience with pigeons, trichomonads were rarely present in the mucous membrane of the throat and pharynx, and that there were generally none present in the nostrils and trachea, but that they were to be found in 50% of the healthy caeca examined. Inoculation experiments gave no results. Neither in young nor old animals could trichomonads be incriminated as a sole cause of enteritis.—Sassenhoff (Munich).

Levine, N. D., & Brandly, C. A. (1939). **A Pathogenic Trichomonas from the Upper Digestive Tract of Chickens.**—*J. Amer. vet. med. Ass.* **95.** 77-78. 2 figs. [6 refs.]

Numerous trichomonads were found in caseous foci in the crop and oesophagus of young pullets. Many dead birds exhibited a variety of intercurrent diseases, but the gross lesions bore a strong resemblance to trichomonad lesions of pigeons and turkeys, and morphologically the parasites were very similar to *Trichomonas columbae*.—M. L. Bingham.

Cailleau, R. (1939). Culture bactériologiquement pure de *Trichomonas gallinarum*, flagelle intestinal de la dinde. [**Bacteriologically Pure Culture**

of *T. gallinarum*, Intestinal Flagellate of Turkeys].—*C. R. Soc. Biol. Paris.* **131.** 873-875. [6 refs.]

Cultures of *T. gallinarum*, isolated from turkey intestine, were first made using horse-serum or coagulated-egg media. The subcultured parasites developed best on media consisting of coagulated sheep serum, Locke's solution, rice starch and egg albumen. The addition of certain antibacterial agents revealed that, whilst acriflavine was more toxic for trichomonads than for bacteria, quinanil was equally toxic for both ; but the parasite was strongly resistant to large doses of sulphanilamide and di-(para-aminophenyl) sulphone, which did not destroy the bacteria. A pure culture of trichomonads was obtained finally by the presence of quinanil in addition to the sulphanilamide and sulphone.—M. L. Bingham.

Gelormini, N. (1938). Tres casos de Eimeria canis. **[Three Cases of Canine Coccidiosis].**—*Inst. Parasit., Univ. B. Aires.* **1.** No. 2. 3-6. 4 figs.

G. found three cases of canine coccidiosis in Buenos Aires within a space of nine days in subjects autopsied for reasons unconnected with this infection, and concluded that the incidence of coccidiosis is probably greater in dogs in the neighbourhood than hitherto realised. Negative findings on examination of faecal material, taken from subjects found by the autopsy to be extensively infected, may be regarded as corroboration of the view of some authors who affirmed that the evacuation of oocysts is periodical and that at other times they remain adherent to or buried in the mucous membrane of the intestine.

Hart, L. (1939). **Coccidiosis of Adult Fowls.**—*Aust. vet. J.* **15.** 30-34. 3 figs. [4 refs.]

Coccidiosis is responsible for heavy mortality annually among chickens in New South Wales but the cases now reported are the first seen in birds over ten weeks of age, in which lesions had been confined to the caeca, the infection being due to *Eimeria tenella*.

H. records cases of acute and peracute coccidiosis in pullets up to the age of sixteen weeks, which on autopsy were found to have lesions resembling those usually associated with *Eimeria necatrix* infection, *i.e.*, intense haemorrhagic enteritis and innumerable white spots in the small intestine representing tissue in which schizonts have developed.

From the lesions present, the microscopic appearance of schizonts, merozoites, and oocysts, the presence of the asexual stage in the small intestine and the sexual stage in the caeca, it is considered that there is sufficient evidence to identify these cases as *Eimeria necatrix* infection. Some cases gave evidence of a mixed infection with *E. necatrix* and *E. mitis*.—H. B. Carter.

Johnson, E. P., & Lange, C. J. (1939). **Blood Alterations in Typhlohepatitis of Turkeys, with Notes on the Disease.**—*J. Parasit.* **25.** 157-166. 2 text figs., 4 figs. on 1 plate, 3 tables. [5 refs.]

Differential white cell counts in normal and blackhead-infected turkeys were made. The leucocytic disturbances were similar in natural and artificial infections. Experimental methods of infection and other haemotological details are described.

A marked increase in the heterophiles persisting until death was seen within 24 hours of experimental infection ; monocytosis in some and myelocytosis prior to death were also observed. Differential leucocyte counts of natural cases of blackhead (diagnosis confirmed after death) with or without the presence of blood protozoa, showed no significant difference. Intravascular forms of the protozoa could not be found in any of the birds after experimental infection.

Certain round forms of protozoa previously seen by the authors in the blood of turkeys, which at autopsy turned out to be affected with blackhead, prompted this work. It is interpreted that these round forms are not related to *Histomonas meleagridis*, but resemble the developmental form of *Leucocytozoon smithi*, and that, therefore, they have no relationship to blackhead.

Lesions of blackhead in the proventriculus and lung, set up after experimental infection, are recorded.—S. G. Iyer.

Travis, B. V., Goodwin, M. H., Jr., & Gambrell, E. (1939). **Preliminary Notes on the Occurrence of *Leucocytozoon smithi* Laveran and Lucet (1905) in Turkeys in the South Eastern United States.**—*J. Parasit.* **25.** 278. 1 table.

It is suggested that some aquatic breeding insect may be responsible for the transmission of *L.s.*, which was demonstrated in turkeys, including wild birds, during a survey made by the authors. Birds of species other than turkeys were examined, but none were found to be infected.—S. G. Iyer.

James, S. P. (1939). **The Incidence of Exo-Erythrocytic Schizogony in *Plasmodium gallinaceum* in Relation to the Mode of Infection.**—*Trans. R. Soc. trop. Med. Hyg.* **32.** 763-769. 1 table. 2 diagrams.

In fowls infected with *Pl. gallinaceum* by injection of blood or with sporozoites by the bites of mosquitoes, infections were more fatal after inoculation with blood than after mosquito transmission, but more deaths occurred during the acute stage after mosquito transmission than after blood inoculation, and more deaths occurred in the chronic stage after blood inoc. than after mosquito transmission. Exo-erythrocytic schizogony occurred in 54 % and 95 % of birds dead after infection with blood and mosquito transmission respectively, and in all cases culminating in death after recovery from the primary attack.

In infection by both methods it was found that relapses occurred 1-8 months after apparent recovery, death being due to the abundance of exo-erythrocytic parasites in the brain, liver, spleen, etc. The schizonts were usually found in early acute stages after mosquito transmission, but only rarely after blood inoculation. In *Pl. gallinaceum* infection exo-erythrocytic schizogony occurrine at a l ate stage of the malarial infection may possibly be regarded as an alternativg method of parasitic multiplication which comes into operation pre-eminently towards the end of the process of repeated schizogony in red blood corpuscles. Why and how it arises at this stage is not known.

Exo-erythrocytic schizogonic forms can presumably arise from parasites which have developed in red blood corpuscles as well as from sporozoites transmitted by the bites of mosquitoes.—M. L. Bingham.

I. Kaufmann, O. (1938). Vergleichende serologische Untersuchungen mit verschiedenen Stämmen der Spirochaete icterogenes und mit der Spirochaeta canicola. [**Serological Investigations of Various Strains of *Leptospira icterohaemorrhagiae* and *L. canicola***].—*Z. ImmunForsch.* **93.** 354-367. 2 tables, 1 graph. [Numerous refs.]

II. Papageorgiu, S. (1938). Ueber die Komplementbindungsreaktion bei Leptospirosen. [**The Complement-Fixation Test in Leptospirosis**].—*Ibid.* **94.** 489-504. 4 tables. [Numerous refs.]

III. Carlinfanti, E. (1938). Studien über die antigenen Eigenschaften der Spirochaeta icterohaemorrhagiae. [**Antigenic Properties of *L.i.***]—*Ibid.* 426-436. 3 tables. [10 refs.]

I. Three strains of *L.i.* and one strain of *L.c.* were tested against 45 samples of sera from patients with Weil's disease. The reactions with *L.i.* were on the whole uniform. The complement-fixation test confirmed the results of the agglutination test in every case. The flocculation test was only reliable with fresh sera. For serological tests in Weil's disease the use of one strain is sufficient, except in rare cases when there are clinical signs of the disease and the test with one strain does not give satisfactory results.

When the sera of these patients were tested against *L.c.*, negative reactions were obtained. K. emphasizes that this is additional evidence that these leptospira are separate entities.

II. Thirty-one samples of sera from human beings and dogs with leptospirosis were compared with ten different samples of monovalent (*L.i.* and *L.c.*) immune serum by agglutination and complement-fixation tests. In most instances the two tests agreed.

On the whole the aggl. test was more specific as to strains and groups than the c.-f. test. The antigen for the c.-f. test should consist of a mixture of a larger number of strains than is necessary for the aggl. test.

III. The coagulation test with lipoid extracts, introduced by Hirschfeld and Klinger, can be used in leptospirosis. The reaction, however, is not specific; there are only group reactions, probably due to alcohol-soluble fractions.

—V. Chládek (Prague).

DISEASES CAUSED BY VIRUSES

Thomsen, O. (1938). Die verschiedenen Virusformen, besonders im Hinblick auf ihre Natur und Herkunft. [**The Nature and Origin of Viruses**].—*Acta path. microbiol. scand.* Suppl. No. 38. pp. 8-26. 1 table. [In German].

Several problems are dealt with. T. discusses whether it is possible to define viruses as a group of agents either differing in principle from pathogenic parasites such as bacteria, protozoa, etc., or constituting a specific variety of these parasites. He then goes on to examine the possibility of establishing certain characteristics peculiar to viruses alone, which might secure for them a definite place in the system of pathogenic agents; he also discusses the nature and origin of these characteristics.

It is suggested that it might be possible to classify viruses according to the effects they produce, and in particular, to find differential characteristics (apart from the pathogenic effect itself) distinguishing from each other the viruses which bring about mainly inflammatory and degenerative processes and the viruses which produce mainly cell proliferation and tumour formation, both benign and malignant.

T. concludes that the present state of knowledge does not permit a positive answer to any of these questions, but that the great progress achieved in methods of research in recent years has made possible considerable clarification of the problems and justifies the hope that data, at present disjointed, may soon be brought together in a synthesis of great practical and theoretical value.

Eross, I. (1938). Előzetes beszámoló a ragadós száj-és körömfájás ellen forgalomba hozott rekonvalescens szérum értékéről. [**Preliminary Report on Value of Convalescent Serum Issued for Immunization against Foot and Mouth Disease**].—*Állatorv. Lapok.* **61.** 334-336.

E. inoculated over 1,000 pigs with convalescent serum and then infected them with F. & M. disease virus. He found that when administered not less than

24 hours previous to the infection and in a quantity of not less than 0·5 c.c. per kg. bodyweight, the serum protected against severe forms of the disease. When an uninfected herd was given convalescent serum and was then given virus artificially, no cases of F. & M. disease developed. Some animals in an infected herd were given convalescent serum and others were left untreated. The morbidity was 10-40 % in the treated animals and 100 % in the untreated, the mortality in the latter being 2·3 %. No abortions were observed among inoculated pregnant sows as a result of the infection, while among uninoculated animals the proportion of abortions was 11 % ; inoculated sucklings of infected mothers did not die.

E. concludes that convalescent serum is a useful means of attenuating the course of the disease.

Oláh, G., & Kanyó, B. (1938). Komplementkötési kísérletek emberi száj- és körömfájásfertözés egy esetével kapcsolatban. [**Diagnosis of a Case of Foot and Mouth Disease in Man by the Complement-Fixation Test**].—*Állatorv. Lapok.* **61.** 260-262. 2 tables. [15 refs.]

The case was observed in hospital and verified by animal inoculation. Convalescent serum taken on the 20th, 32nd and 40th days from the first observation of the disease gave well-defined though incomplete complement fixation with an antigen prepared by maceration in water of F. & M. vesicle tissue from a g. pig infected with a homologous virus strain.

The sera of g. pigs infected three times with F. & M. virus gave a very weak fixation or none at all.

The authors consider that the complement-fixation reaction is a useful aid to diagnosis in cases of human F. & M. disease, especially in the initial period of convalescence.

Moulis, M. (1938). Quelques expériences sur le vaccin formolé contre la péripneumonie bovine. [**The Use of Formolized Vaccine against Contagious Bovine Pleuro-Pneumonia**].—*Bull. Serv. zootech. Epiz. A. O. F.* **1.** No. 1. 10.

M. describes experiences with Curasson's formolized vaccine and agrees with him that when so vaccinated, the animals resist natural, but not artificial infection.

Eichhorn, E. A., & Manthei, C. A. (1939). **Propagation of the Virus of Vesicular Stomatitis in the Chick Embryo.**—*J. Amer. vet. med. Ass.* **94.** 608-611. [3 refs.]

The authors showed that virus from g. pig pads, dried *in vacuo*, was viable at the end of five months.

The method used for the propagation of the virus on the chorio-allantoic membrane was that described by Burnet [*V. B.* **4.** 726.] with small modifications.

Tests made indicated that 11-day-old embryos were the most suitable for the propagation of virus and that the optimal period of growth was 40-48 hours' incubation.

The virus was carried through 26 serial passages. Between the 3rd and 8th generations the amount of virus obtained, as shown by the growth on the chorio-allantoic membrane, seemed to fall, indicating a period of adaptation ; from this stage until the end of the last passage it appeared to increase in concentration and virulence. The final embryo-passaged material appeared to be enhanced in virulence compared with the animal-passaged material. Antigenically it appeared similar.—L. E. Hughes.

Schofield, F. W. (1937). **A Report of Two Outbreaks of Equine Influenza due to Virus Carriers (Stallions).**—*Rep. Ont. vet. Coll. 1937.* p. 15.

Two notable outbreaks of equine influenza among mares, which had been bred to imported stallions, are reported. The symptoms were those of typical influenza; no cases terminated fatally. Since the stallions used came from a stock-farm where there had been a severe outbreak of influenza previously, it is suggested that the virus was carried in the reproductive organs. An unsuccessful attempt was made to infect an aged mare with semen taken from a suspected stallion six months after the outbreak.—J. L. Byrne.

Andrewes, C. H., & Smith, W. (1939). **The Effect of Foreign Tissue Extracts on the Efficacy of Influenza Virus Vaccines.**—*Brit. J. exp. Path.* **20.** 305-315. 5 tables. [11 refs.] [Authors' summary copied *verbatim*].

Vaccines made from infected ferrets' tissues have proved useless for immunizing mice against influenza virus [human—Ed. *V. B.*], though mouse-tissue vaccine is highly effective.

On the other hand, living influenza vaccines are of equal value for immunizing ferrets whether made from ferret or mouse tissues. Analysis of these phenomena appears to show that the efficacy of a vaccine depends upon the resultant of several factors: (1) the titre of the virus used for preparing the vaccine, (2) the animal source of the vaccine, (3) the route of inoculation, and (4) the state of the virus, whether living or inactivated. The relative poorness of vaccines made from heterologous species is probably accounted for by the fact that foreign tissue extracts interfere with the immunizing response. Some evidence suggests that this interfering effect is greater when inactivated vaccines are being used.

Fortner, J. (1938). Die ansteckende Blutarmut der Einhufer. [**Equine Infectious Anaemia**].—*Berl. tierärztl. Wschr.* Jan. 7th. 1-6. 2 tables, 2 graphs, 4 maps.

This is a review of E.I.A. as it has occurred in Germany since 1918; the number of outbreaks has shown a continuous increase during recent years. Two cases in man, verified by reinfection of horses, are reported. Four attempts were made to transmit the disease by tabanids, but only one, in which a horse was subjected to 67 bites, was successful; experiments with 4, 24 and 38 fly bites were negative. One horse under observation had been a virus carrier for 14 years. There is no curative treatment, and as any treatment might cloak the infection it should not be attempted, as it would merely interfere with the control of the disease. Difficulties of diagnosis are discussed. Other diseases are excluded only by observation and repeated blood examinations. Puncture of the liver of old horses to provide material for histological examination is often difficult. Except in acute and subacute cases P.M. examinations do not reveal diagnostic lesions.

In every suspected case a histological examination of the liver, spleen, kidney and heart should be made. Virus carriers should be destroyed and the quarantine six months instead of three. All cases of equine infectious anaemia should be reported, whether found during life or after slaughter. The meat of horses affected with the disease is unfit for food and must be condemned according to the Meat Inspection Law.—V. Chládek (Prague).

Manninger, R. (1938). Fertözési kísérletek a lovak fertözö kevésvérüségének ragályanyagával. [**Experimental Infection of Horses with Equine Infectious Anaemia**].—*Állatorv. Lapok.* **61.** 341-342. [Also appeared in *Arch. wiss. prakt. Tierheilk.* **73.** 425-427. (1938)].

Experiments conducted with an artificially infected horse showed that the

blood and urine of the animal were infective on contact with the intact skin of horses. The urine proved to be more virulent than the blood both by cutaneous infection and by infection *per os*.

I. Mitchell, C. A., Walker, R. V. L., & Plummer, P. J. G. (1938). **Studies in Equine Encephalomyelitis. Chick Embryo Vaccine as a Protective Agent.**—*Canad. J. comp. Med.* **2.** 211-222. 9 tables. [11 refs.]

II. McIntosh, R. A. (1938). **Equine Encephalomyelitis from a Clinical Point of View.**—*Ibid.* 223-227. 1 fig.

III. Mitchell, C. A., Walker, R. V. L., & McKercher, D. G. (1938). **Clinical Symptoms of Encephalomyelitis in Artificially Infected Horses.**—*Ibid.* 271-275. 3 figs. [1 ref.]

I. After a brief review of some of the characteristics of equine encephalomyelitis, as well as its history and the developments made in its study, the authors describe their method of cultivating the virus in the chick embryo (essentially that of Burnet); they show that the equine encephalomyelitis virus reaches a much higher titre in the chick embryo than in naturally infected tissues which were examined. Comparing the ability of their own chick-embryo vaccine, a chick-embryo vaccine supplied by Wyckoff, and two commercial equine brain vaccines to protect g. pigs against an intracranial inoculation of mouse brain virus, they found that the two former induced a solid immunity whereas the equine brain vaccines did not. Four horses protected by Wyckoff's chick-embryo vaccine [work not yet published] withstood a test intracranial dose of 1 c.c. of a 1:300 suspension of infected g. pig brain, whereas four of five unprotected horses used as controls became infected when similarly treated. It is suggested that the immunity conferred by a chick-embryo vaccine lasts for about a year.

II. This paper, written for the benefit of the clinician, emphasizes some of the pertinent facts regarding encephalomyelitis. The seasonal incidence and the existence of the two types of virus are pointed out, and the writer presents some facts on the course and symptoms of the disease, its diagnosis, the type of treatment for milder cases, and methods of prevention.

III. Basing their observations on the symptoms produced in horses artificially infected with equine encephalomyelitis, the authors divide the course of the disease into four stages. (1) Early febrile stage—marked by a rise in temperature to 104°F.-106°F. in 12 hours. (2) Hypersensitive stage—lasting for approximately 12 hours and manifesting itself particularly in hearing and touch. (3) Early lethargic stage—consisting of irritability, muscular tremors, engorgement of the capillaries of the eyes and nasal mucous membranes, rigidity of the cervical muscles and refusal to eat or drink due to lack of association of ideas. (4) Late lethargic stage—in which there was rapid fall in temperature, extreme fatigue, and tetanoid spasms followed in a few hours by Cheyne-Stokes respiration. At this stage the animals were destroyed.—J. L. Byrne.

Kubes, V., & Ríos, F. A. (1939). **The Causative Agent of Infectious Equine Encephalomyelitis in Venezuela.**—*Science.* **90.** 20-21.

Comparative researches have demonstrated that the virus of Venezuelan equine encephalomyelitis is immunologically different from both the American western type virus and the Argentine virus, and that although it bears relationship to the American eastern type virus on account of its high virulence and pathogenicity, it is immunobiologically distinct from it.

The vaccine produced from Venezuelan virus possesses much greater protective power against that virus than the American bivalent vaccine, while the corresponding serum neutralizes the specific virus both *in vivo* and *in vitro*.—D. D. Ogilvie.

Rumpl, L. (1939). Auftreten der Encephalomyelitis enzootica suum in Oesterreich. [**Encephalomyelitis enzootica suum in Austria**].—*Wien. tierärztl. Mschr.* **26.** 1-6.

A brief clinical account, drawn from the literature, of the main symptoms of enzootic encephalomyelitis in swine [see Teschin disease—*V. B.* **4.** 466.], together with some clinical notes sent in to R. by veterinary practitioners on cases observed in South Bohemia and the Upper Danube. Attempts were made to deal with the condition by vaccination and chemotherapy. This is followed by a concise description of four outbreaks which R. himself investigated in the neighbourhood of Linz. These cases would suggest that the condition may exist as an epizootic in Austria, and also that strict measures should be taken to check its further progress in that country.

Geiger, W. (1938). Die Bedeutung des Institutes zur Bekämpfung der Virus-Schweinepest in Eystrup a.d. Weser für die Erforschung und Bekämpfung von Virus-Seuchen. [**The Work on Virus Diseases of the Swine Fever Research Institute, Eystrup on the Weser**].—*Vet.-med. Nachr. Bayer-Meister Lucius.* Suppl. pp. 101-105.

The institute is owned by I. G. Farbenindustrie A.G. and from its early beginnings in 1922 as a swine fever serum-producing station it has been expanding, and much research has been carried out. Work has been done on the effects of secondary bacterial invasion in swine fever, the differential diagnosis, and the search for biological methods of diagnosis of the disease. Attempts to find a small convenient laboratory animal susceptible to the virus were unsuccessful. The length of survival of the virus in various media and its susceptibility to disinfectants has been studied ; 2% caustic soda has been found the best disinfectant and is in general use. The epidemiology of the disease has been studied, and experiments on the carriage of the virus by birds, rodents, etc., have been made. It was shown that recovered animals harboured the virus for no longer than 3-4 weeks, and that danger of spread from such animals was slight. The virus was found to be unaffected by pickling. Much work was done on the methods of preventive inoculation. The serum-simultaneous method has given consistently good results ; a standardized virus of known virulence was later issued for this purpose. Vaccines had been found less efficient than serum-virus inoculation for the control of swine fever.—H. E. Harbour.

Eveleth, D. F., & Schwarte, L. H. (1939). **Chemical Changes in the Blood of Swine Infected with Hog Cholera.**—*J. Amer. vet. med. Ass.* **94.** 411-417. 8 tables. [19 refs.]

Determinations were made of the N.P.N., urea N, amino-acid N, uric acid, creatinine, cholesterol, albumin, globulin, total protein, sugar, chloride, CO_2, Ca, Mg, P, fibrin and haematocrit values of the blood of 12 pigs artificially infected with S.F. virus, all samples being taken after a fast of at least 14 hours. Data are presented in tabular form, and, in the case of 6 animals in which periodic analyses are recorded, indicate mainly a progressive fall in the haematocrit value and some decrease in plasma Ca, while in 3 of them an appreciable rise in total cell P is shown. [Little attempt is made to explain the various changes].—Alastair N. Worden.

Hont, I. (1938). Haematologiai vizsgálatok sertéspestisvirussal mesterségesen fertőzött angol süldőkön. [**Haematological Investigations on Young Pigs Artificially Infected with the Virus of Swine Fever**].—*Állatorv. Lapok.* **61.** 361-365. 2 figs., 2 tables. [8 refs.]

Investigating the changes in the blood picture of pigs affected with swine

fever and finding the available data concerning the normal blood picture of pigs contradictory, H. first examined the normal blood of 30 young English pigs and found the average number of R.B.C. to be 7,600,000 and of W.B.C. 19,700 per c.mm. Of the latter, 49·5% were lymphocytes, 38·6% neutral leucocytes, 4·3% eosinophiles, 2·0% basophiles, 4·0% monocytes.

After artificial infection with swine fever virus, all the pigs showed a progressive leucopenia which reached its height on the 7th-8th day. Only two animals survived, whose W.B.C. number returned to normal by the 12th day. In addition to such changes H. observed a change in the nuclei of the neutrophiles and a decrease or disappearance of the eosinophiles and basophiles. Of twelve other certainly susceptible young pigs nine were given serum-virus in varying doses while three served as controls. The blood of these animals showed much less leucopenia and a more rapid return to normal, the degree of the leucopenia being inversely proportional to the quantity of serum inoculated.

PLUMMER, P. J. G. (1939). **Preliminary Studies of Distemper Virus on the Chorio-Allantoic Membrane of the Developing Egg.**—*Canad. J. comp. Med.* **3.** 96-100. 5 figs., 2 tables. [4 refs.]

Evidence is presented to show that the virus strain utilized produced lesions on the chorio-allantoic membranes of some embryos on original inoculation. Taking as a criterion the percentage of membranes affected on each serial passage, the infectivity of the virus appeared to be enhanced through five serial passages; thereafter the infectivity waned and disappeared. Affected membranes of the 6th and 5th passages respectively of two trials produced distemper in ferrets. The dilution and time factors excluded any possibility of the original inocula being carried from egg to egg mechanically. One ferret inoculated with the 11th passage of the virus on chorio-allantoic membranes remained well for forty days, but succumbed to distemper when inoculated with active virus.—L. M. HEATH.

DERBEC, E. (1938). Essai sur la préparation d'un sérum homologue spécifique contre la maladie de Carré par la méthode des substances adjuvantes et stimulantes. [**Preparation of a Specific Homologous Serum against Dog Distemper**].—*Thesis, Alfort.* pp. 63. 2 tables. [Numerous refs.]

This thesis consists of three parts. In the introduction D. summarizes the general principles of immunization; in Part I he discusses the influence of certain adjuvants on the immunizing value of antigens in general, and Part II concerns the various methods employed for the production of distemper serum. In Part III the author describes a few experiments he devised and carried out to determine whether the incorporation of distemper virus in a base consisting of lanoline and vaseline, would yield a serum richer in antibodies than that obtained by present methods. His results were negative and he supposes that, owing to the extreme fragility of the virus except when kept in the dried state, the diffusion of the lanoline-vaseline mixture would be so slow that the virus would be killed locally.—GWILYM O. DAVIES.

MASSÉ, J. (1938). Essai sur la gastro entérite infectieuse des chats. [**Infectious Gastro-Enteritis of Cats**].—*Thesis, Lyons.* pp. 77. [Numerous refs.]

This is a comprehensive description of the disease, dealing chiefly with the following aspects :- history, aetiology, epidemiology, symptomatology, lesions, diagnosis, immunization, treatment and prophylaxis. It is chiefly a summarized account of the many publications on this subject, and thus is mainly a statement of the generally accepted views and contains little new information.

Regarding immunity M. states that vaccination with formalinized virus confers a solid and durable immunity but that serum therapy is of little value. Hitherto no known specific remedy for this disease has been found.

The concluding pages contain brief descriptions of ten cases which have come within the author's experience [see also *V. B.* **5.** 19].—Gwilym O. Davies.

Barrat, E. (1939). Echtyma contagieux des lèvres et vaccination. [**Vaccination for Contagious Ecthyma**].—*Rev. Méd. vét., Toulouse.* **91.** 278-282.

B. gives some observations on outbreaks of contagious ecthyma in sheep. Where the teats of ewes were affected by the disease, mastitis followed in many cases. Lesions were not seen in more than one site in the same animal. Vaccination is suggested. [A clinical article. No account is taken of comparatively recent work on this condition, and no details of vaccination trials are included.]

—H. E. Harbour.

Sahai, L. (1937). **The Diagnosis and Control of Doyle's Disease [Newcastle Disease] of Fowls.**—*Proc. Anim. Husb. Res. Wkrs Conf. India, 1936.* pp. 64-68. Discussion pp. 69-70. [8 refs.] [See *V. B.* **7.** 531].

S. gave an historical and general account of Newcastle disease in India. In the discussion Pfaff said that his attempts to make an effective vaccine had failed. Dissemination of the disease by carriers such as crows and hawks was mentioned. Shirlaw referred to the first outbreak of this disease in India at Ranikhet, and discussed the question of vaccination.—S. G. Iyer.

Gözsy, B., & Schneider, L. (1938). A baromfihimlö virusának adsorbeáltatása szénnel és az adsorbeált virus antigen hatásáról. [**Adsorption of Fowl Pox Virus on Charcoal : the Antigenic Value of such Adsorbed Virus**].—*Állatorv. Lapok.* **61.** 400-403. 6 tables. [14 refs.]

Active charcoal was found to adsorb fowl pox virus. The antigenic effect of charcoal-adsorbed virus was approximately the same as that of the original tissue virus.

Brandly, C. A., & Dunlap, G. L. (1938). **An Outbreak of Pox in Turkeys with Notes on Diagnosis and Immunization.**—*Poult. Sci.* **17.** 511-515. 4 figs., 1 table. [9 refs.]

Lesions appear to have developed on the feet from natural pox infection after toe punching (holes in web) done for identification purposes at the age of one day. Inoculation tests with material from the lesions indicated that the virus was of low pathogenicity. Diagnosis was based on the presence of Borrel bodies in tissues examined, together with a previous history of the incidence of pox among adult birds on the premises.

Methods for diagnosis and the histological distinctions between the lesions of pox in turkeys and chicks are discussed. The outbreak was successfully controlled by culling, removal of affected birds, and vaccination by skin puncture with a strain of fowl pox virus in the form of 0·2% suspension of infected chorio-allantoic membrane. The egg-culture virus used had undergone 68 serial passages through developing eggs over a period of about two years.—S. G. Iyer.

Tóth, A. (1938). A himlöröl. [**Vaccinia**].—*Állatorv. Lapok.* **61.** 219-223 and 239-241.

Investigating the susceptibility to cow pox of other domestic animals T. found that horses, goats, lambs, piglets, cats, dogs and fowls could be infected by commercial cow-pox lymph as used for human vaccination.

PARASITES IN RELATION TO DISEASE [ARTHROPODS]

HYSLOP, J. A. (1938). **Losses Occasioned by Insects, Mites, and Ticks in the United States.** pp. 57. 13 tables. [7 refs.] Washington, D.C.: U.S. Department of Agriculture. [4to] [Mimeographed].

Only ten pages of this bulletin are devoted to insects affecting animals. The estimated losses for the following diseases or pests are given separately :– equine encephalomyelitis; piroplasmosis of cattle; screw-worm infestation; cattle warbles; *Stomoxys* and the horn fly [*Lyperosia* (*Haematobia*) *irritans*]; buffalo gnats (*Simulium*); goat lice, and poultry pests. The figures given include loss resulting from death, from interference with working and productive ability, and from the expense of control measures.—KATHARINE SANDERSON.

—. (1938). **Discussion on Blowflies of Sheep.** [SPEAKERS: ROSS, I. C., HOBSON, R. P., MOORE, W., HENRY, M., DU TOIT, P. J., HOPKIRK, C. S. M., LAMONT, H. G., & WHITTY, J. D.]—*Rep. 1st. Imp. vet. Conf. Lond. 1938.* pp. 51-56. Weybridge: Imperial Bureau of Animal Health. [5s.]

Ross reviewed the problem of sheep myiasis in Australia, which costs the sheep industry about £4,000,000 per annum. *Lucilia cuprina* is responsible for about 75% of strikes. Practically all the strikes occur in the breech or perineal region, important predisposing causes being soiling due to worm infestation and also the presence of skin folds in the region of the anus.

Prompt destruction of carcasses, large scale trapping—which had been experimentally shown to reduce strike incidence by 20-50% when a trap to every 10-20 acres was used—selective breeding for plain conformation and greater density of wool, and the surgical removal of skin folds in the anal region, have all been found useful as preventive measures. Jetting with arsenical preparations is extensively practised.

In the ensuing discussion, HOBSON described the conditions leading to development of strike under British conditions [*V. B.* **7.** 280, and **8.** 247]. Body strike is common in the United Kingdom and is often due to a condition apparently identical with " water rot " in Australia.

MOORE described experiments in Scotland to control strike by spraying sheep [*V. B.* **10.** 29]. He suggested that the increase of strike was related to increase of nutritious grasses. HENRY held that in Australia at least this was not true, and WHITTY stated that in Ireland strike had recently appeared for the first time on many hill grazings where no apparent improvement of pasture had occurred.—J. MACLEOD.

CHADHA, S. R., & SONI, B. N. (1939). **Regional and Seasonal Distribution of Warble Fly** (*Hypoderma lineatum*) **and Its Economic Importance in the North-West Frontier Province.**—*Indian J. vet. Sci.* **9.** 101-108. 1 map.

The results of a survey on the incidence of *Hypoderma* infestation in cattle and goats are given, including figures which indicate a yearly loss of 40% in the case of goat skins, and 50% in the case of cow hides. A map showing the regional distribution of the fly is appended.—M. L. BINGHAM.

VAZ, Z., & TEIXEIRA DE CARVALHO, G. (1938). Sobre um tipo interessante de miíase dos bezerros e seu agente causal. [**A Curious Type of Myiasis of the Mouth in Young Calves**].—*Rev. Fac. Med. vet., S. Paulo.* **1.** 43-48. 4 figs. [4 refs.] [English summary].

The larvae of *Cochliomyia hominivorax* installed themselves in the gums of

calves whose teeth were erupting, where they developed, and reached the alveolar cavity, where they remained after the incisors had come through, occupying the space between the root of the tooth and the wall of the alveolus. The health of the infested animals was not affected; treatment consisted in forcing the larvae out of their location. [How parasites, situated in an alveolus, were forced out, is not clear].—S. TORRES.

I. MACLEOD, J. (1939). **The Ticks of Domestic Animals in Britain.**—*Emp. J. exp. Agric.* **7.** 97-110. 1 text fig., 4 figs. on 2 plates, 1 map.

II. MACLEOD, J. (1939). **The Seasonal and Annual Incidence of the Sheep Tick, *Ixodes ricinus*, in Britain.**—*Bull. ent. Res.* **30.** 103-118. 12 figs. [12 refs.]

I. Only four genera (comprising thirteen species) of ticks are represented in the indigenous or established fauna of the British Isles. The chief species found on domestic animals are *Dermacentor reticulatus*, found in Devon, Somerset and the Aberystwyth area on sheep and cattle; *Haemaphysalis cinnabarina* var. *punctata* in Kent upon cattle and sheep, and *Ixodes ricinus*, *I. hexagonus*, and *I. canisuga* on mammals and birds with less restricted distribution.

A detailed account is given of the life history, geographical distribution and the conditions limiting the activity and distribution of *I. ricinus*, the most important species. Diseases transmitted by *I. ricinus* include piroplasmosis in cattle, louping-ill and tick-borne fever in sheep, pyaemia in lambs, and probably spirochaetosis in grouse. Methods of control are discussed, the best method appearing to be a combination of starvation of the ticks and dipping of the sheep. A summary of the action of different types of dips upon ticks and the method of dipping sheep for tick infestation is given.

II. The tick *Ixodes ricinus* normally has a two-phase curve of seasonal activity in Britain in so far as its principal host, the sheep, is concerned. The first phase occurs in spring and terminates in early May in Argyllshire, in the middle of May in Perthshire and towards the end of May in the Borders and Northumberland. The second phase, which is a much less serious infestation, occurs during the period September-October. In summer, infestation is relatively low and during winter it is practically absent. The seasonal activity was found to be related to the air temperature, the range being from 45°F. to 60°F. (average weekly maximum). Density of sheep stock did not influence the seasonal activity. No evidence was obtained of an increase in density of ticks in any area. On a moor in North-east Scotland the tick was found to be active throughout the summer, attaining its maximum in July.—W. MOORE.

CALZADA, V. (1938). Nueva comprobacion de " Ixodes ricinus " en el pais. [*Ixodes ricinus* **in Uruguay**].—*Bol. mens. Direcc. Ganad., Montevideo.* **22.** 238-241. [1 ref.]

Collections of ticks sent for identification to the central laboratory revealed the presence of *Ixodes ricinus* in the departments of Rocha, Cerro Largo and Maldonado. The commonest host appeared to be the woodland deer *Mazzama simplicornis*. The life cycle of *I. ricinus* and its identification are summarized and C. concludes that the parasite is firmly established in Eastern Uruguay, and probably in other parts of the country.—J. PASFIELD.

MAIER, E. (1939). **Histology of Demodex folliculorum.**—*J. Lab. clin. Med.* **24.** 594-596. 3 figs. [1 ref.]

The characteristics of the Demodicoidea are briefly discussed with special

reference to *D. folliculorum*. The appearance of a skin lesion in a human being due to invasion by this parasite is illustrated by means of three photomicrographs, the main features being an infiltration of the lesion by round cells and the presence of phagocytic giant cells. Numerous parasites are seen lying adjacent to the hair shaft, and the lesion itself is isolated by a surrounding heavy wall of connective tissue.—M. L. Bingham.

Seyfarth, Martha. (1939). Luftsackmilben (Cytodites nudus) als Krankheitserreger bei Hühnern. [**Air Sac Mites** (*C. nudus*) **in Hens**].—*Dtsch. tierärztl. Wschr.* **47.** 289-291. 4 figs. [12 refs.]

A general paper containing a description of the lesions of broncho-pneumonia produced by *C. nudus* in a two-year-old Rhode Island Red hen.—A. L. Wilson.

PARASITES IN RELATION TO DISEASE [HELMINTHS]

I. Mönnig, H. O. (1939). **Pasture Hygiene with Respect to Parasitic Diseases.**—*Rep. 13th int. vet. Congr. 1938.* **1.** 666-671. [In English: French, German and Italian summaries. Discussion pp. 686-687 in English].

II. Taylor, E. L. (1939). **Grazing Hygiene with Respect to Parasitic Diseases.**—*Ibid.* 672-682. [11 refs.] [In English: French, German and Italian summaries. Discussion pp. 686-687 in English].

I. M. points out that pasture hygiene is more important in the control of internal than of external parasites. The McLean County System of swine sanitation is given as an example of a successful control measure. The importance as factors favouring parasitic infestation of climatic conditions, concentration of animals, and of prolonged grazing are considered. Greater details are given of the effects of the type of soil, type and abundance of vegetation, the interval between successive grazings and the mode of entry of the parasite into the host, M. considering that their importance is not generally realized.

II. T. shows how the control of parasitic disease of grazing animals is dependent on a knowledge of the biology of the free living larval stages of the parasites, including their longevity and their reaction to different climatic conditions, together with a knowledge of the factors affecting their accumulation on pastures. A short description of these factors is given and estimations of the numbers of parasites. As many as 6,000 horse strongyle larvae per pound of pasture herbage have been demonstrated. The following methods of controlling the number of larvae are discussed :– resting the pasture, forcing the growth of grass; grazing by unsuitable host animals; hay-making; burning; ploughing, and the application of larva-destroying substances.—Katharine Sanderson.

Cameron, T. W. M. (1939). **Animal Parasites of Wild Animals.**—*Rep. 13th int. vet. Congr. 1938.* **1.** 633-642. [In English: French, German and Italian summaries. Discussion pp. 642-645 in English, French and German].

A general review of parasites of wild animals in Canada is given, dealing with those of economic importance, and those transmitted from wild to domestic animals, and to man. Overcrowding is stated to be the most important single factor causing parasitic disease. This can be natural, artificial, or deliberate as in zoological gardens and sanctuaries. C. considers that regional surveys are needed to collect information on the relative importance and frequency of the different parasites. The technique used for these surveys by the Institute of Parasitology of MacDonald College, Quebec, is given.—Katharine Sanderson.

Aygün, S. T., & Baskaya, H. (1939). Anwendung der Allergie-Reaktion bei der Bekämpfung der Distomatose. [**Allergic Tests for Distomatosis**].—*Tierärztl. Rdsch.* **45.** 379-382. 4 tables.

Ether, chloroform, carbon tetrachloride, carbon disulphide and acetone extracts prepared from freshly dried and powdered flukes were used as antigens. The dose was 0·25 c.c. and was injected intradermally on the under side of the tail. Eighty-nine sheep and eleven goats were used in the experiments and the faeces of each animal were examined for eggs while the tests were being carried out. A positive reaction manifests itself in five minutes at the earliest and persists for five hours at the latest. The skin at the site of injection is red and oedematous, the persistence of the redness being the decisive factor in the interpretation of the results. In a negative reaction there is only a slight redness which disappears in from one to one and a half hours. Occasionally a false reaction is encountered in which the oedema persists, but the redness disappears in forty-five minutes. In two instances a positive reaction was obtained, yet faecal examination failed to reveal the presence of eggs. The two animals concerned were slaughtered and distomatosis was confirmed by P.M. examination. The best results were obtained with the ether extracts; no reaction at all was observed with the acetone and chloroform extracts.—A. L. Wilson.

Zontschew, W. T. (1937). Zur Frage der Spezifizität der "Casoni-Botteri"-Reaktion. [**Specificity of the Casoni-Botteri Reaction (Skin Test for Worm Parasites)**].—*Festschrift Bernhard Nocht, 1937.* pp. 695-698. 3 tables. [17 refs.] Hamburg: Friederichsen de Gruyter & Co. [In German].

Z. injected 0·2 c.c. of *Echinococcus* and of *Taenia solium* antigens (spoken of here as the Casoni-Botteri test), and of a 1% solution of Witte's peptone as control, intracutaneously into 10 *Echinococcus* patients, 11 *Taenia* patients and 15 who were worm-free or infected with helminths of other groups. The reaction was found to be specific for taenioid infections, *Echinococcus* patients giving a very strong reaction, particularly with *T. solium* antigen. *Taenia* patients [*saginata* and *solium*] gave a good reaction with *T. solium*, and in two cases only a weak one with *Echinococcus* antigen.—E. S.

Joyeux, C., & Baer, J. G. (1938). Sur quelques cestodes de galliformes. [**Some Cestodes of Gallinaceous Birds**].—*Trav. Sta. zool. Wimereux.* **13.** 369-389. 9 figs., 1 table. [Numerous refs.]

The authors deal with four species of *Raillietina* found in birds. The history, geographical distribution, morphology, and development of *R. cesticillus* are fully described, and this parasite is compared with two related species, *R. ransomi* and *R. maroteli*. The ant, *Tetramorium semilaeve*, was found to harbour the cysticercoid of *R. echinobothridia* in Marseilles. Finally, a new variety of *R. circumvallata*, *cadarachensis* var. nov. is established. The new variety was found in young partridges and hens imported from Indo-China, the partridges often being reared by indigenous hens. Unsuccessful attempts were made to determine the life-cycle of the new variety by using terrestrial molluscs and various insects collected from the same locality as the infested birds.—A. L. Wilson.

Feng, L. C., & Hoeppli, R. (1939). **Attempts to Immunize Rats and Mice against** *Cysticercus fasciolaris*.—*Chin. med. J.* **55.** 45-54. 3 figs., 3 tables. [2 refs.] [In English]. [Authors' summary copied *verbatim*].

Injection of emulsions, prepared from either fresh or dried substance of *C. fasciolaris* into white rats with unknown natural immunity, and inbred mice of a less and a more resistant strain, failed to produce immunity to *C. fasciolaris* when eggs of *T. taeniaeformis* [adult of *C. fasciolaris*] were fed to the rats and mice.

In rats the number and size of the cysts were similar in injected animals and controls ; in mice of the same strain, the result was similar.

On the other hand, mice belonging to the less resistant strains, whether injected or not, had, on the average, more cysts than mice of the more resistant strain.

Apart from resistance as a character of the strain, the degree of natural immunity depended also on the individual irrespective of the strain, since in animals of both strains which had received an equal number of *Taenia* eggs, there were some completely free from infection.

I. Stoll, N. R. (1937). **Tapeworm Studies VI. Beginning of Reproductive Maturity of *Moniezia expansa* in Sheep.**—*Festschrift Bernhard Nocht, 1937.* pp. 611-619. 1 table. [18 refs.] Hamburg : Friederichsen de Gruyter & Co. [In English]. [See *V. B.* **8.** 371].

II. Stoll, N. R. (1938). **Tapeworm Studies VII. Variation in Pasture Infestation with *Moniezia expansa*.**—*J. Parasit.* **24.** 527-545. 4 figs. [Num. refs.]

I. Evidence is presented that eggs and proglottids of *M.e.* appear in sheep faeces 35-38 days after infection. Cases are recorded where infection was first detected up to 46 days after removal from infected pasture, and as much as 65 days after first exposure, the reasons for the delay being obscure. P.M. examination earlier than the 35th day after exposure has so far not yielded any mature worms.

II. By P.M. counts of tapeworms carried by sheep exposed for a known time, S. has determined the average daily rate of infection to be from 1-2 worms, when the rate of pasture reinfestation is steady. Gradation in size of the worms from any one animal, together with the small infestation, usually one or two worms, in sheep exposed for a single day, indicate that worms are picked up in small numbers at intervals throughout exposure. The age of the susceptible host and the concentration of sheep per acre did not affect the daily rate. Hay feeding during reduced winter grazing did prevent infection. Otherwise there was a clear relationship between rate of reinfestation of the pasture and the daily rate of infection, with an intervening time lag accounted for by the period of development in the intermediate host.

In a postscript, S. describes the successful infection of sheep by feeding with mites, *Galumna nigra* and other species of *Galumna*, which had been experimentally infected with *M.e.* eggs.—E. S.

Krull, W. H. (1939). **On the Life History of *Moniezia expansa* and *Cittotaenia* sp. (Cestoda : Anoplocephalidae).**—*Proc. helminth. Soc. Wash.* **6.** 10-11.

Of over 20 species of oribatid mites obtained from pastures of the National Research Centre, Maryland, only *Galumna emarginata* was found to carry the cysticercoid of *M.e.* A two-month old lamb, which was fed five newly-dissected cysticercoids in gelatin capsules over a period of $2\frac{1}{2}$ weeks, was found on autopsy $2\frac{1}{2}$-5 weeks later, to harbour two immature tapeworms $2\frac{3}{4}$ inches and 99 inches long.

Rabbits were not infected by feeding with mites from *Cittotaenia*-infested pasture, but three out of five acquired two tapeworms each when kept on a plot where *G.e.* was present. *Cittotaenia* eggs withstand alternate freezing and thawing for over 100 days. The hexacanth embryos are viable for 325 days in water at 36°-38°F., but viability is impaired by drying.—E. S.

Riley, W. A. (1939). **Maintenance of Echinococcus in the United States.**—*J. Amer. vet. med. Ass.* **95.** 170-172. [16 refs.]

Autopsy of a large number of wild mammals showed that the maintenance

of hydatid infection of wild animals in the United States is in all probability due to the fact that wolves play the part of reservoir hosts. In the present study 5 out of 12 wolves examined harboured adult worms. The intermediate host of the parasite in many cases appears to be the moose, and cysts were found in the lungs of 11 of the 21 of these animals which were examined.—D. D. Ogilvie.

Barnett, Louis (1939). **The Incidence and Prevention of Hydatid Disease in New Zealand.**—*N.Z. med. J.* **38.** 256-262. 5 tables.

Figures are given covering the incidence of hydatid disease in human beings in New Zealand over a period of several years. It is considered that more than half of sheep and cattle reaching adult life in New Zealand are affected with *Echinococcus* or with *Cysticercus tenuicollis*.

The progress of the campaign for the eradication of hydatid disease by issuing arecoline hydrobromide tablets with dog licences is discussed, and the objection of dog-owners that the use of this drug is accompanied by danger to the dog is discounted as being greatly exaggerated.—L. W. N. Fitch.

Schmid, F. (1939). Beitrag zur Kenntnis der kleinen Lungenwürmer (Protostrongylidae Leiper 1926) von Schaf und Wild. [**Research on Small Lungworms (Protostrongylidae) of Sheep and Wild Game Animals**].—*Dtsch. tierärztl. Wschr.* **47.** 429-430. 2 figs. [Numerous refs.]

The author's conclusions are based on the examination of the lungs of sheep, hares and deer for evidence of infestation by parasites of the family Protostrongylidae. In sheep were found *Protostrongylus rufescens* in the bronchi, *P. nigrescens* in dark nodules in the lung tissue and *Muellerius capillaris* in white nodules in the lung tissue. *P. commutatus* was found in the bronchi of hares and rabbits. In roe-deer *P. capreoli* was found in or near characteristic grey or yellowish grey parasitic nodules, or free in the lung tissue. In red deer *P. sagittatus* was found in dark red areas of the lung tissue.—A. L. Wilson.

Christenson, R. O. (1938). **Life History and Epidemiological Studies on the Fox Lungworm, *Capillaria aërophila* (Creplin, 1839).**—*Livro Jubilar Prof. L. Travassos.* pp. 119-136. 3 figs., 6 tables, 3 graphs. [Numerous refs.] Rio de Janeiro: Instituto Oswaldo Cruz. [In English].

On one ranch where C. examined 5,000 animals by gross observation in 1927, and 7,000 in 1928, an average infestation of 6·2% was found in the first year, and of 12·9% in the second. No intermediate host appears to be necessary. The eggs become infective 40 days after being passed. From 7-10 days after ingestion of infective eggs by a fox, larvae reach the lungs, presumably *via* the vascular system, although they have not been detected in the blood. Longevity of the adults is less than one year. Egg viability tests show a 50% mortality after 139 days' exposure to winter temperatures ranging down to −26°C. They are killed by temperatures above 55°C. Ultra-violet radiation with a 4·5 amp., 75 volt current at a distance of 12 inches kills all the eggs in 10 minutes, and 80% of them in two minutes. Mortality is complete after two weeks in soil with humidity ranging from 1·6-2·3%.—E. S.

Faust, E. C. (1937). **The Life Cycle of *Strongyloides*. Introduction.**—*Papers on Helminthology, Commemorating 30 Year Jubilee of Prof. K. I. Skryabin.* pp. 160-166. [Numerous refs.] Moscow: Lenin Acad. Agric. Sci. [In English: Russian summary].

F. concludes that the indirect life-cycle is the basic mode of development.

The direct type has been developed as an adaptation to unfavourable external conditions, and the hyperinfective type in order to remain for long periods as a wholly internal parasite. Rhabditiform males of the parasitic generation exist for a short time during the incubation period, but do not invade the tissues. Under optimum external conditions, *Strongyloides* may survive as an entirely free-living organism.—E. S.

SAWITZ, W. (1939). **Trichinella spiralis. I. Incidence of Infection in Man, Dogs, and Cats in the New Orleans Area as Determined in Postmortem Examinations.**—*Arch. Path.* **28.** 11-21. 2 figs., 6 tables. [16 refs.] [Author's summary copied *verbatim*].

Examination of human diaphragms and pectoral muscles obtained in four hundred routine unselected necropsies disclosed 24 cases of infection with *T. spiralis* in the New Orleans area—an incidence of 6 per cent. The compressor method detected 2 cases in which both the diaphragm and pectoral muscles were available, the diaphragm was found infected in 20 cases, or 87 per cent. and the pectoral muscle in 13 cases, or 56·5 per cent. Surveys in which diaphragms only are examined would thus miss 13 per cent. of the cases. The average number of *T. spiralis* found in the diaphragm was 0·35 per gram ; the average number in the pectoral muscle, 0·22 per gram. The diaphragm is, therefore, not only qualitatively but also quantitatively the better tissue for examination. No history of clinical symptoms of trichinosis was found in any of the 24 cases. With increasing age the incidence of trichinella infection increased. The highest incidence was found in Negro females (6·66 per cent.) ; the lowest, in white females (5·8 per cent.).

The incidence of trichinella infections in 300 dogs in the New Orleans area was found to be 1·3 per cent., the incidence in 90 cats was found to be 10 per cent. The incidence in cats is considered to serve as an indicator of the endemicity of trichinella infection in an area.

IMMUNITY

SEIDEMAN, R. M. (1939). **A Comparative Study of Old Tuberculin and the Purified Protein Derivative.**—*Amer. J. Hyg.* Sect. B. **30.** 1-10. 5 tables, 2 charts. [8 refs.]

Three solutions of O.T. and three batches of P.P.D., tested on tuberculous g. pigs, were comparable in a ratio of 100 parts of O.T. to one part of P.P.D. by weight. All the samples compared favourably with the international standard in regard to potency.

Groups of students were tested with O.T. (0·005 mg. to 0·5 mg.) and P.P.D. (0·00005 mg. to 0·005 mg.). The results indicated that the percentage of reactors was approximately the same with the two products, while O.T. was as specific as P.P.D. in the detection of tuberculous disease confirmed by X-ray examination. It was noted, however, that P.P.D. elicited larger reactions than O.T. in the lower concentrations, whereas the higher concentrations of O.T. seemed to be more sensitive than the P.P.D. These results were confirmed in g. pigs.

It is suggested that the extraneous substances in O.T. may have been responsible for the greater proportion of reactions to high concentrations. Stored preparations of P.P.D. were as stable as O.T.—R. E. GLOVER.

CANIĆ, R. J. (1936). Uporedba dijagnostičke vrijednosti aglutinacije, vezivanja komplemenata i Meinickeove reakcije kod bruceloza. [**Comparative Study**

of the Value of the Agglutination and Complement-Fixation Tests and Meinicke's Reaction in Brucellosis].—*Jugoslov. vet. Glasn.* **16.** 563-572 and 603-611. 3 tables. [Numerous refs.] [German summary].

A series of tests on 447 animal sera, obtained from cattle, swine, rabbits and g. pigs, was carried out by C. in order to find out which is the best serum test for brucellosis.

The agglutination test is both simple and specific, but requires too much time and should not be used on cloudy sera. This method sometimes gives negative results in positive cases ; it should, therefore, be used in combination with another method.

Meinicke's lipoidal reaction (MKR II) is stated to be both strongly specific and simple. Better results are obtained by centrifugation than by the micro-method. This method gives the lowest percentage of false results, and may therefore be employed alone.

The complement-fixation test is precise, but it gives the highest incidence of false results (4·92%). A further disadvantage is its complicated technique. This method is superior to the agglutination test in cases of both chronic and latent disease, but in recent cases it is inferior. Complement fixation, for some unknown reason, appears to be particularly unreliable with swine serum. This method should also not be used with an old serum.

Generally for more reliable results the use of at least two of the above methods together is recommended.

The original should be consulted for details.—B. Oswald (Križevci).

Anderson, C., & Disdier, C. (1938). Contribution à l'étude de la méthode de Nattan-Larrier pour le diagnostic sérologique des leishmanioses. [**Nattan-Larrier's Method for the Serological Diagnosis of Leishmaniasis**].—*Arch. Inst. Pasteur Tunis.* **27.** 203-210. 3 tables. [1 ref.]

A general account of Nattan-Larrier's technique for the complement-fixation test for leishmaniasis.—F. H. Manley.

Lovell, R. (1939). **The *Corynebacterium pyogenes* Antitoxin Content of Animal Sera.**—*J. Path. Bact.* **49.** 329-338. 5 tables, 1 graph. [10 refs.] [Author's summary copied *verbatim*].

The *C. pyogenes* antitoxin content of sera can be measured by their power to inhibit the haemolysis of rabbit cells by the toxin.

A sample of immune rabbit serum has been taken as a standard and assumed to contain 50 " X " units of *C. pyogenes* antitoxin per c.c., and sera from cattle, pigs, sheep, goats, horses, rabbits, man, dogs and monkeys have been compared with it.

The distribution of *C. pyogenes* antitoxin in the sera of the different animal species is correlated with susceptibility to infection with *C. pyogenes*. Thus a higher mean and a greater variability in the antitoxin values is found in cattle, sheep, goats and pigs than in man and rabbits. Horses show slightly more variability than man and rabbits.

In bovines there is an association between increasing age and a higher mean and greater variability of antitoxin values in the sera.

There is an association between the higher antitoxin values in the sera and the stimulus provided by natural infection with *C. pyogenes*, injection of living *C. pyogenes* or the injection of *C. pyogenes* toxoid.

The significance of these results is discussed and it is suggested that the test employed may be of value in the field in assessing the incidence of *C. pyogenes* in a particular herd or area.

SCHREIBER, W., & MÜLLER, W. (1938). Grundlegender Versuch zur Klärung der Frage, auf welchem Wege sich die Sensibilisierung in der Epidermis ausbreitet. [**The Transmission of Skin Sensitization**].—*Derm. Wschr.* Nov. 26th. 1393-1395. 2 tables. [Abst. from abst. in *Lancet.* **236.** 1531].

The authors made experiments to determine the route by which a local cutaneous sensitization to a given antigen travels to the rest of the body. Incisions were made in the interscapular area of nine g. pigs so as to isolate islets of epidermis without interfering with their vascular, lymphatic, or nervous connections with the subcutaneous tissues.

The living epithelial pedicles of four of the g. pigs were painted daily with a 5% solution of dinitro-chlorbenzene. After 5-7 days, varying with the colour (from white to piebald), a severe eczematous reaction, with erythema, vesicles, and crusting, developed in each of the isolated areas. The areas had become sensitized to the irritant. The reaction of the rest of the skin was then tested with a 0·25% solution of the same compound, but even after 8 days there was not the slightest tendency to the production of eczema in other areas. In other words, a general epidermal sensitization had not taken place. The reverse experiment was equally decisive. The whole of the skin of the other five g. pigs, except that between the scapulae, was then universally sensitized to the chemical, and it was found that when the weaker solution was applied to the islands, no sensitization had developed in the tissues at these sites.

VAN DEN ENDE, M. (1939). **Some Observations on Reversed Anaphylaxis.**—*J. Hyg., Camb.* **39.** 471-497. 12 text figs., 4 figs. on 1 plate, 5 tables. [Numerous refs.] [Author's summary copied *verbatim*].

The symptoms and autopsy findings in guinea-pigs following intravenous injection of antisera prepared against guinea-pig serum fractions are described. Two types of reaction were observed, acute and delayed, similar to those described in direct anaphylaxis.

The alterations in systemic blood pressure, pulmonary arterial pressure, and bronchial resistance, were investigated and found to simulate closely those observable in ordinary anaphylactic shock.

The antisera have the power of stimulating contraction of the isolated uterus of the guinea-pig, either in the presence or absence of excess guinea-pig serum. The reaction, like that observed in direct anaphylaxis, is therefore cellular.

Antisera prepared against guinea-pig serum proteins contain, in addition to precipitins, agglutinins for the red cells of that species, and Forssmann anti-body. Neither of the last two antibodies, however, is responsible for the shock phenomena here described. It appears that the potency of a serum to produce shock in guinea-pigs is dependent on several factors, of which the most important is the content in precipitins reacting with the guinea-pig serum proteins. These precipitins give rise to the reactions following intravenous injection into guinea-pigs, not merely as a result of humoral combination with homologous antigens, but largely if not wholly, as the result of an immune reaction with antigens in the protoplasm of the tissue cells.

DISEASES, GENERAL

IVANOFF, K. (1939). **The Extent and Economic Importance of Bovine Tuberculosis and Contagious Abortion (Brucellosis) in Bulgaria.**—*Month. Bull. agric. Sci.* **30.** 211T-214T.

In the introduction it is stated that the livestock census taken at the end of

1934 showed that there were in Bulgaria about 1,500,000 cattle and 375,000 buffaloes.

Tuberculosis.—Bovine TB. is said to be comparatively rare. Its incidence is calculated from the results of clinical examinations, meat inspection records and by subcutaneous tuberculin tests. In 1937, 35,000 cattle were tuberculin tested and the reaction percentage was 2·13. Some incomplete records based on previous tests are also given. The control of bovine TB. is provided for in a law put into force in 1924. The regulations include the slaughter of infected animals and of positive reactors to the tuberculin test, and the compulsory tuberculin testing of cows and buffalo cows, the milk of which is sold for human consumption. [Full details are not given].

Contagious Abortion.—The true extent of this disease is not known. Area tests are, however, being carried out. When the disease is diagnosed in a herd the affected animals must be isolated and they may only be released if sold for slaughter. The use of a live vaccine is prohibited.

Only eight cases of Malta fever had been diagnosed in Bulgaria up to 1939. —J. C. Wallace.

Thorp, W. T. S., & Hallman, E. T. (1939). **Pathology of Calf Pneumonia.**—*J. Amer. vet. med. Ass.* **94.** 365-371. 16 figs. [8 refs.]

A study of 40 cases of calf pneumonia at East Lansing, Michigan, showed that three variations of the condition existed. In the first the animal died in a few days of an acute pneumonia characterized by serofibrinous exudation into the alveoli without evidence of proliferative changes. The second type was an acute pneumonia superimposed on a chronic broncho-pneumonia with extensive consolidation and fibrinous pleurisy. The third type was characterized by abscess formation followed by necrosis. In the two latter types the course of the disease was prolonged in some cases for several weeks. Histological examination showed that the pneumonia in nearly all cases began in the apical lobes, and that injury to the bronchioles was prior to a generalized bronchitis. Twenty-six of the cases were studied bacteriologically. The organisms isolated most consistently were streptococci of the β type, *Bact. communior* and *Staphylococcus aureus*. The staphylococcus was present chiefly in cases in which there was abscess formation, and was probably secondary to the other organisms which the authors consider to be the causative agents of the disease.—D. D. Ogilvie.

Mócsy, J., & Szélyes, L. (1938). A roncsoló orrhurut különös esete szérumtermelés céljából hyperimmunizált tehénen. [**Bovine Malignant Catarrh in a Serum-Producing Cow**].—*Állatorv. Lapok.* **61.** 79-81. 5 figs.

A 12-year-old cow used for the production of diphtheria antiserum developed malignant catarrh two days after a routine toxin injection. All cows had been kept under constant veterinary supervision and had previously never shown such a reaction to toxin injections. Investigating the possible reasons for the affection, the authors found that the cow in question had recently been moved into a stable previously occupied by sheep showing symptoms of contagious ecthyma. They regard this as confirmation that direct infection is possible, and they suggest that there might be a connexion between the virus of ecthyma and the virus of malignant catarrh.

Hamerski, E. (1938). Zakazne zapalenie mózgu u koni wstępujace we wschodnich województwach Polski. [**Equine Infections Encephalomyelitis in East Poland**].—*Rozprawy Biol.* **16.** 1-75. 3 figs., 2 tables. [Numerous refs.] [German summary].

In recent years in Eastern Poland an infectious encephalomyelitis has caused

great losses in horses, particularly in spring. Individual outbreaks have resulted in a mortality rate of 50-90%. It has been shown that it is not Borna disease. On the other hand, the encephalomyelitis has some resemblance to one described by DOBBERSTEIN as " Leberkoller ". It is distinct from enzootic spinal paralysis [*V. B.* **6.** 608.] and from enzootic haemoglobinuria [*V. B.* **8.** 595.], which are also known in Poland.

The disease affects chiefly farm horses and horses pastured on marshy ground. Direct infection rarely occurs and it appears that water and insects may spread the disease indirectly, though in one instance it was thought that an infected horse infected two other horses by biting them.

The manifestations of the disease are variable. In acute cases death takes place after a few days, but there is no high fever. On the contrary subnormal temperature is often noted. The disease is sub-acute in about 10% of cases and in such cases recovery usually takes place slowly. It has been observed that affected pregnant mares may produce healthy foals after recovery. Affected horses constantly show bilirubinaemia and in a few cases hyperglycaemia. The erythrocyte sedimentation rate is slowed and the R.B.C. count raised. Leucocytosis occurs in complicated cases, and lymphocytosis during convalescence.

Pathological visceral lesions are those related to a septicaemia. The spleen is not enlarged, the brain is rarely altered on naked eye inspection, but on histological examination there are to be seen degeneration of ganglion cells, injury to nerve fibres and an increase of the glia cells. No inclusion bodies have been seen. The liver is always affected with jaundice and histologically shows a condition of acute yellow atrophy in some cases.

Attempts to transmit the disease experimentally have shown that horses can rarely be infected by intracerebral inoculation. The same applies to rabbits. The causal agent is present in the brain, spinal cord, liver, spleen and salivary glands, but rarely in the blood and never in the cerebrospinal fluid. White mice, cats, piglets and goats proved refractory to infection. It is said that rabbits which are repeatedly inoculated subcutaneously with virus are resistant against subsequent intracerebral inoculation.

No specific treatment or immunization method has been elaborated for horses.

—V. CHLÁDEK (PRAGUE).

WATSON, E. A. (1937). **Swine Diseases in Western Canada.**—*Sci. Agric.* **18.** 22-31.

For orientation W. first established from official statistics that whole carcass condemnations had decreased for the whole of Canada over a three-year period, and were identical for eastern and western Canada respectively by the latest records examined. In the tabulation of these condemnations it was apparent that there was no disease condition peculiar to Western Canada.

No official statistics existed, but data from informed sources concerning diseases of swine in Western Canada revealed no evidence of specific infectious and contagious diseases, peculiar to that area, likely to produce epidemics. The diseases incriminated as causing the heaviest losses were the usual run of swine maladies.—L. M. HEATH.

VAWTER, L. R., & RECORDS, E. (1939). **Observations on the Stiff Lamb Problem, with Special Reference to White Muscle Disease.**—*J. Amer. vet. med. Ass.* **94.** 489-491. [7 refs.]

" Stiff lamb disease " includes a number of conditions, some of which are bacterial in origin and others of doubtful or obscure aetiology. Included under this

head are lesions of the feet, joints and muscles. Brief reference is made to the conditions which are of bacterial origin, with notes on the types of associated husbandry. The present knowledge of " white muscle disease " is reviewed ; its aetiology is obscure. The authors are of the opinion that the disease may be due to some nutritional or metabolic factor or factors, and quote the work of HJÄRRE and LILLEENGEN [*V. B.* **8.** 113.] who, by feeding to calves rations deficient in vitamins B and C, produced degenerative changes similar to those seen in natural cases. The authors believe that the bacterial conditions discussed can be adequately controlled by the adoption of sanitary measures, and that all the diseases included under this term of " stiff lamb disease " can be controlled by good husbandry and attention to feeding of the ewes before and after parturition. [Many readers will find the name " stiff lamb problem " misleading. The authors include under this designation cases of " joint ill ", and inflammatory lesions in the neighbourhood of the coronets due to the necrosis bacillus].—L. E. HUGHES.

ALBORNOZ, J. E. (1938). Informe sobre una enfermedad aparecida en el ganado caprino de una hacienda cercana a Bogota en el año 1935. [**A Disease of Goats on an Estate near Bogota in 1935**].—*Rev. Med. vet., Bogotá.* **8.** No. 71. 10-16.

This disease resembled contagious agalactia and was noticed after the introduction of new stock with Spanish antecedents. An " encapsulated streptobacillus " was isolated from affected animals. The mortality was very high.

—A. H. HUNTER.

MORRILL, C. C. (1939). **Generalized Fat Necrosis.**—*J. Amer. vet. med. Ass.* **95.** 233-234. 3 figs. [4 refs.]

A case of generalized fat necrosis is described in a 10-month-old Duroc Jersey gilt. The chief symptoms were anorexia, pyrexia, weakness, lameness, and swelling of several joints. The rapid plate agglutination test for swine erysipelas was positive, and the animal died in 5 days. On autopsy fat necrosis, involving practically all depots of the body, was the most striking lesion. There were lesions in the pancreas and several joints yielded staphylococci on bacteriological examination. [There is no mention that the bacillus of swine erysipelas was demonstrated].

—D. D. OGILVIE.

HUDSON, R. (1938). **Oedema of the Digestive Organs in Young Pigs.**—*Vet. J.* **94.** 356-357.

A brief description of disease characterized by death after a short illness in separate groups in recently weaned pigs kept on a diet that was too rich. Oedema of the wall of the small and large intestines and of the mesentery was found in the affected animals. The cause is ascribed to the forced feeding.—F. H. MANLEY.

DOWNHAM, K. D. (1939). **The Control of Turkey Diseases.**—*Harper Adams Util. Poult. J.* **24.** 404-408.

Turkeys are extremely susceptible to diseases affecting poultry and particular attention should be paid to nutrition, hygiene and management by those in charge of them. D. carried out feeding experiments to ascertain whether particular foodstuffs had any influence on susceptibility to blackhead. He records results with " stabilarsan vet " in the control of blackhead in turkeys ; he recommends treatment at 6-8 weeks of age.

He gives a short description of the nature and control of the common diseases of turkeys, such as blackhead, coccidiosis, *Salmonella pullorum* infection, lympho-

matosis, avian tuberculosis and parasitic infections. Infection of turkeys with most of these diseases can be prevented by keeping them separate from other poultry.

Eggs with roughened shell were laid by a number of turkeys in breeding pens, and this condition was considered to be the result of defective mineral metabolism.—S. G. Iyer.

Eriksson, K. (1938). Vererbung pathologischer Veränderungen und Zustände in den Geschlechtsorganen des Rindes. [**Inheritance of Pathological Changes in Sexual Organs of Cattle**].—*Rep. 13th int. vet. Congr. 1938.* **2.** 1344-1354. 4 figs., 4 tables. [In German: English, French and Italian summaries.]

In Swedish mountain districts a type of partial or complete sterility resulting from hypoplasia of ovaries and testes is very widespread. This hypoplasia affects the germinative tissue. Unilateral hypoplasia was observed in 25% of 2,100 animals on 70 farms; it was generally left-sided and often caused reduced fertility. Bilateral hypoplasia was seen in 4-5% of cases and such animals were completely sterile.

The hypoplasia was found to be hereditary and not connected with any other diseased condition. Detailed analysis of breeding records demonstrated the proportions of cases of unilateral and bilateral hypoplasia observed following various matings (normal × normal, normal × hypoplastic, etc.). The figures so obtained were found to fit in closely with those theoretically estimated on the assumption that two recessive factors were involved, and it is shown that such a theory adequately explains the observed results. Each recessive factor acting individually can cause unilateral hypoplasia; when acting together they cause a bilateral hypoplasia.—H. E. Harbour.

Hetzel, H. (1938). Adatok a kanca elvetélésének oktanához. [**Aetiology of Abortion in Mares**].—*Állatorv. Lapok.* **61.** 113-122. 3 figs., 8 tables. [Numerous refs.]

H. was called in to investigate a series of unexplained abortions in a stud. Necrosis of the chorionic villi occurred in 15 out of a total of 18 abortions in 1935. All bacteriological and serological tests gave negative results. The stabling, feeding and general care of the animals were the same as in previous years. Mechanical injuries, exposure and strain could be ruled out. No drugs capable of producing abortion had been administered.

H. concluded that the abortions were due to hormone deficiency and subjected the urine of a number of pregnant mares and mares that had aborted to a series of tests. The urine of 42 pregnant mares gave a positive reaction to the Allen-Doisy test in 41 (97·5%) and of 7 mares that had aborted in 6 (85·5%) cases, showing that their urine contained oestrone. Out of 43 pregnant mares the urine of 26 (60·5%) gave a positive reaction to the Aschheim-Zondek test, prehypophysin thus being present in these instances. The Clauberg test gave positive results with 31 out of 44 pregnant mares (70·5%) and with 3 out of 10 mares that had aborted (30%) showing that their urine contained progesterone.

In one mare that had aborted there was necrosis of the chorionic villi and her urine gave a negative reaction to all three hormone tests; and H. believes that in this case the abortion was due to hormone deficiency. He therefore advised the addition of freshly germinated wheat to the diet of pregnant mares from the eighth month of pregnancy onwards, to supply Vitamin E. No abortions occurred in the stud concerned after this change had been made in the diet.

An examination of the stud records relating to all abortion cases has convinced H. that heredity plays an important part in the occurrence of abortion. Constitutional weakness leading to a reduction of breeding capacity is hereditary and finds expression in either sterility, abortion or the death of newborn animals. There are more males among aborted foetuses and more unweaned males die than females, indicating that recessive lethal factors are sex-linked.

Süle, G. (1938). Adatok a kancák meddőségéhez és a csikózási eredményekhez. [**Sterility in Mares**].—*Állatorv. Lapok.* **61.** 44-45. 3 tables. [5 refs.]

Statistical data on the percentage of pregnancies in relation to services, and of births in relation to pregnancies. S. attributes the comparatively low pregnancy percentage (59-63 %) less to sterility, which he estimates at 10 %, than to unnoticed abortions in the early stages.—E. M.

Webster, W. M. (1938). **Recent Advances in the Research on Sterility in Rams.**—*Proc. Ann. Meet. Sheep Fmrs., N.Z., 1938.* pp. 57-61. 1 table.

Figures are presented to demonstrate the value of pH determinations of semen as a guide to the fertility of rams. It was found that fertility decreased with rising alkalinity. A field semen testing outfit for the use of farmers was suggested ; this outfit would include a simple type of artificial vagina [described], indicator and colour chart.—L. W. N. Fitch.

Gray, E. (1939). **Further Observations on Fowl Paralysis.**—*Vet. Rec.* **51.** 754-757. 4 figs.

G. reports his observations on 58 birds from four outbreaks of apparent fowl paralysis in East Anglia. Most of the birds were parasitized by coccidia and helminths. On P.M. examination the peripheral nerves were somewhat oedematous but not lymphomatotic. In a bacteriological study a coccoid organism was isolated from the affected nerves of 37 of the birds, and attempts were made to reproduce the disease by inoculating culture of this organism into 8 birds from " known fowl paralysis-free stock ". Other birds were infected artificially with coccidial oocysts and with worm eggs. The results of these experiments are detailed, but do not appear to have been significant with regard to the status of the coccoid bacteria.—C. V. Watkins.

McClary, C. F., & Upp, C. W. (1939). **Is Paralysis of Fowls, as Manifested by Iritis, Transmitted Through the Egg?**—*Poult. Sci.* **18.** 210-219. 9 figs. 6 tables, 1 chart. [Numerous refs.]

The literature on the subject is reviewed. There is great diversity of opinion concerning the varied manifestations involved in this complex disease. White Leghorns were used in the investigation. Experimental methods are described in detail.

The data obtained give indications that fowl paralysis is transmitted through the egg and that it is contagious. Production is not much affected in slight cases of fowl paralysis associated with iritis. Coccidiosis and parasitic infections apparently played no part in this work. Dipping hatching eggs in chlorine solution before incubation appears to have no harmful effect on hatchability.—S. G. Iyer.

Rothbard, S., & Herman, J. R. (1939). **Attempts to Propagate Fowl Tumors Produced by Benzpyrene and by Virus. Sites of Implantation Used : Eye of Chicken and Chorioallantoic Membrane of Chick Embryo.**—*Arch. Path.* **28.** 212-222. 2 figs., 3 tables. [12 refs.] [Authors' summary copied *verbatim*].

Sarcoma was produced in 3 chickens by injection of benzpyrene. Attempts

to transplant 2 of the tumors into 39 chickens were unsuccessful, and the third tumor could be transplanted in but 1 of the 47 chickens in which it was inoculated. In subpassage this tumor grew in only 1 of 10 chickens into which it was passed, and on further passage, in 1 of 13.

These tumors could not be propagated in the anterior chambers of chickens' eyes, and attempts to propagate 1 of the 3 tumours on the chorioallantoic membrane of the chick embryo were unsuccessful.

The fact that the benzpyrene-induced tumors were transplanted with such difficulty indicates that if they contained any virus they did not contain any of the readily transmissible viruses studied in this laboratory.

The virus-induced sarcoma 13 studied in control experiments was grown on the chorioallantois in 70·8 per cent., in the breast of the chickens in 65·7 per cent. and in the anterior chamber of the chicken's eye in 50 per cent. of the trials. The fact that the growth may be observed directly in the anterior chamber makes this a valuable site for the study of tumor propagation.

This tumor was transmitted on egg membranes for eight successive generations.

Cell-free material from sarcoma 13 produced sarcoma on the chorioallantoic membrane of the chick embryo as well as in the breast of the inoculated chicken.

WITHERS, F. W. (1939). **Squamous-celled Carcinoma of the Tonsil in the Dog.** —*J. Path. Bact.* **49.** 429-432. 1 fig. on 1 plate, 1 table. [5 refs.]

Contrary to earlier observations, W. finds a high incidence of tonsillar carcinoma in dogs. During a period of 16 months, 396 dogs were autopsied; 100 were cases of neoplasia, 53 had carcinoma, of which 24 were squamous-cell growths originating in the tonsil. They were commonest in dogs over 6 years old. The right tonsil was affected in 13 and the left in 5, while in 6 the tumour was bilateral. Metastases were found in the retropharyngeal (21 cases), submaxillary (2) and prescapular (3), lymph nodes, and in the lungs (5). Early involvement of the retropharyngeal nodes was common, there being at times considerable enlargement, while the primary growth was comparatively insignificant. Secondary (bacterial) infection of a tumour-bearing lymph node was present in 5 dogs, and in one instance a sinus passed from such a retropharyngeal node to the mid-ventral surface of the neck. The histological structure in all cases was typical of squamous-celled carcinoma. Of other domestic animals, only one (a cat) was found to have a tumour of this type.—J. WHITTICK.

SCHWEITZER, M. D., & FURTH, J. (1939). **Susceptibility to Transmitted Leukemia Occurring in Pure Bred and Hybrid Mice.**—*Amer. J. Cancer.* **37.** 224-232. 8 tables. [19 refs.] [Authors' summary copied *verbatim*].

Spontaneous leukemias originating in the highly leukemic stock Ak, in stock Rf in which the incidence of leukemia is low, and in first generation and other hybrids, were inoculated into mice of each of the pure stocks and of various hybrid combinations. The leukemias arising in different hybrids behaved in transmission experiments like the Ak leukemias.

All of these leukemias can be transmitted to almost every member of the leukemic stock Ak and to F_1 generation hybrids, but not to members of stock Rf. All hybrid combinations tested have a substantial proportion of susceptible individuals, including dominance of inheritance; but further investigation is required to determine if one or two dominant genes are responsible for susceptibility.

The duration of illness and the anatomical characteristics of leukemia are not modified by the genotype of the host.

The susceptibility factors of both Ak and Rf leukemias are not allelomorphic.

Evidence is presented that these genetic factors are specific for susceptibility to transmissible leukemia, and differ from those that, according to Loeb, determine susceptibility for normal tissue grafts.

CHAMBERS, R., & GRAND, C. G. (1939). **Neoplasm Studies. V. The Effect of Carbohydrate on the Accumulation of Granulocytes in Various Mouse Tumors.**—*Amer. J. Cancer.* **36.** 369-382. 8 figs. [13 refs.] [Authors' summary copied *verbatim*].

1. The injection into a tumor of substances, *e.g.*, starch and cellulose, which are positively chemotactic to blood granulocytes may cause an extensive accumulation of granulocytes and a consequent widespread necrosis involving the entire tumor. The percentage of complete regression for the more rapidly growing transplantable tumors (sarcoma 180 and carcinoma 63) was about 40 per cent. For the more slowly growing spontaneous and methylcholanthrene-induced tumors it was somewhat higher.

2. The starch and cellulose injected tumors which did not regress showed either no accumulation of granulocytes or a restricted accumulation walled off from the healthy part of the tumor by a fibrous capsule.

3. No granulocytic response was observed in tumors to trauma or to hemorrhage; to the injection of suspensions in Ringer's solution of carbon, carmine, manganese dioxide, or melanin granules; or to sugars in aqueous solution.

4. Spontaneously appearing necrotic regions in mouse sarcoma 180, carcinoma 63, methylcholanthrene-induced and spontaneous tumors were all found to be relatively free of granulocytes. Spontaneous necrotic tissue gave no evidence of attraction to granulocytes in tissue culture.

LEWIS, Margaret R. (1939). **A Transmissible Monocytoma of the Mouse.**—*Amer. J. Cancer.* **36.** 34-43. 8 figs. [9 refs.] [Author's summary copied *verbatim*].

The strain-specific transplantable growth designated as monocytoma No. 255, which arose from the implantation of a white spot on the spleen of a mouse injected intraperitoneally with dibenzanthracene 411 days previously, is composed of malignant cells of the monocyte type (the majority of them being permanently altered large epithelioid cells) and is transplantable by means of living cells of the same kind.

ANDERVONT, H. B. (1939). **Development and Genetic Characteristics of the Adenomatous Stomach Lesion in Strain I Mice.**—*Publ. Hlth Rep., Wash.* **54.** 1851-1855. 1 fig. on 1 plate. [5 refs.] [Author's summary copied *verbatim*].

The adenomatous lesion of the stomach which occurs spontaneously in practically all adult mice of strain I appears earlier and is more pronounced in the male mice.

The susceptibility to the development of the lesion is inherited as a recessive characteristic, and a number of factors are involved.

SURE, B., THEIS, R. M., HARRELSON, R. T., & FARBER, L. (1939). **Influence of Walker Carcinosarcoma on Concentration of Ascorbic Acid in Various Endocrines and Organs.**—*Amer. J. Cancer.* **36.** 252-256. 3 tables. [4 refs.] [Authors' summary copied *verbatim*].

The implantation of Walker carcinosarcoma 256 in the albino rat produced the following definite changes in ascorbic acid in endocrine glands and organs:

adrenals, 15 per cent.; thymus, 35·3 per cent.; spleen, 30 per cent.; kidney, 12·8 per cent.; liver, 15·4 per cent.; lung, 23·3 per cent. The reduction in ascorbic acid content was not influenced by changes in water metabolism in the lung, liver, kidney, and adrenals. Such records, however, were not taken for the other endocrine glands or for the spleen. The tumor-bearing animals showed a marked hypertrophy of the adrenals and spleen and a considerable atrophy of the thymus.

McEuen, C. S. (1939). **The Occurrence of Lymphosarcoma in Rats.**—*Amer. J. Cancer.* **36.** 383-385. 3 figs. [2 refs.] [Author's summary copied *verbatim*].

A lymphosarcoma apparently originating in the ileocaecal lymph nodes, metastasizing readily and rapidly killing its host, is described.

Csato, T., Wetzler-Ligeti, C., & Wiesner, B. P. (1939). **The Development of Malignancy in Animals and Changes in the Restropic Activity of Blood.**—*Amer. J. Cancer.* **36.** 262-268. 1 fig., 2 tables. [4 refs.] [Authors' summary copied *verbatim*].

(1) The blood of intact rats and rabbits yields restropic [REStropic] extracts.

(2) The implantation of Walker rat sarcoma is followed by the disappearance of the positive and, at a later stage, by the appearance of a negative restropic factor.

(3) In rabbits treated with 1:2:5:6-dibenzanthracene the positive reaction disappears at a stage when the index has fallen below the base line. Subsequently the blood may develop negative activity, even though no tumour can be detected by direct observation.

McEuen, C. S. (1939). **Observations on Rats Treated with the Sex Hormones Estrin and Testosterone.**—*Amer. J. Cancer.* **36.** 551-566. 18 figs., 1 table. [13 refs.] [Author's summary copied *verbatim*].

(1) The occurrence of 3 tar cancers of the skin, one uterine cancer, and one gastric cancer are reported in rats fed with an estrin product obtained from pregnancy urine. A tar cancer is recorded in one control rat.

(2) Whereas in rats injected with estrone for long periods carcinomata of the genital tract and breast occurred accompanied by other usual estrin effects, it appears that with prolonged injection of testosterone the females went into permanent vaginal diestrus, the pituitary weights were not above normal limits, somatic growth was not inhibited, and the predominant neoplastic lesions were fibrous tissue tumours in injected areas, some of which became sarcomatous.

NUTRITION IN RELATION TO DISEASE

Quin, J. I. (1938). **Animal Nutrition in South Africa.**—*Rep. 13th int. vet. Congr. 1938.* **2.** 1267-1274. [In English: French, German and Italian summaries. Discussion pp. 1275-1281 in French, German and Italian].

This report is limited to discussion of a few outstanding features in the nutrition of cattle and sheep in South Africa. Throughout the year most of these species are dependent on whatever naturally growing edible vegetation is to be found on the open veld. But primarily owing to seasonal fluctuations and irregularities in the distribution of the rainfall, favourable conditions alternate with unfavourable, so that the problem of a continuous food supply in South Africa is of the greatest significance. Whilst vast quantities of field crops are now being produced, there is still some " lag " in the full utilization of all the available food-

stuffs. This matter is one of great urgency to the stock industry, as at present any policy aiming at improvement through breeding soon becomes handicapped and at times completely overshadowed by nutritional problems. In addition to rainfall, two other limiting factors affecting the natural plant growth are the fairly widespread deficiencies of soil phosphorus and nitrogen, and overstocking, with consequent soil erosion and the appearance of less valuable types of vegetation.

Dealing with the nature of the nutritional deficiencies in South Africa, Q. states that there is a deficiency of readily assimilated energy-bearing carbohydrate foods on the veldt during winter and periods of drought. In addition, the pastures may also be deficient in such protective food substances as good quality proteins, phosphorus and possibly vitamin A during certain periods of the year. The influence of these deficiencies, especially on growing and producing stock, is stressed. Mention is made of the lines along which research work on animal nutrition is progressing.—N. J. Scorgie.

Biester, H. E., & Eveleth, D. F. (1939). **Some Nutritional Studies in Swine.**—*J. Amer. vet. med. Ass.* **94.** 517-521. 3 figs., 4 tables.

The significance of the demyelination of the fibres of the spinal cord is an extremely important point in the pathology of nutritional and infectious diseases. Data are presented in this article to show that it is possible to produce demyelination in the spinal cord of swine even when the rations contain apparently adequate amounts of vitamins A, B, C, D, E, and G. The rations were fed in the form of dry meals, each containing a varying proportion of yellow maize with or without skim milk powder, and mineral supplement. On such feed the swine in addition manifested fatty degeneration of the liver and kidneys, which were seemingly related to the quality and quantity of protein fed. Severe degenerative changes were also present in the ovaries or testes. The authors interpret the myelin sheath degeneration as a manifestation of malnutrition rather than a change due to a specific cause. It is assumed that the factor or factors necessary to prevent demyelination are present in grasses or other green foods.—N. J. Scorgie.

Dye, J. A., & Chidsey, Jane A. (1939). **Ketone Body-Total Carbohydrate Utilization Ratios and their Relation to the Problem of Ketosis.**—*Amer. J. Physiol.* **127.** 745-750. 1 fig., 1 table. [16 refs.] [Authors' summary copied *verbatim*].

Utilization ratios for total ketone body and total carbohydrate have been determined on eviscerated, nephrectomized, normal and depancreatized dogs following the intravenous injection of sodium acetoacetate in amounts up to the tolerance of the animals. Ratios significantly higher than the theoretical 2:1 prevailed when the ketone body concentrations were high, lower ones when these were low. They were not affected significantly by pancreatectomy or evisceration.

The rate of ketone body utilization by the tissues is not influenced by blood sugar levels, but by their own concentrations in the blood and tissues.

The existing evidence for and against the ketolytic and antiketogenic theories of carbohydrate action in relieving ketosis is briefly discussed. The antiketogenic theory is favoured.

Lenkeit, W., & Becker, M. (1938). Zur Beurteilung von Fütterungsazidosen beim Wiederkäuer durch Harnanalyse. [**Detection of Nutritional Acidosis in Ruminants by Urine Analysis**].—*Landw. VersSta.* **129.** 151-156. 2 tables. [6 refs.] [Abst. in *Brit. chem. Physiol. Abstr.* June, 1938. p. 496, copied *verbatim*. Signed: A. G. P.]

The acid-base status in sheep during prolonged feeding of acid silage is

followed by means of determination of pH and NH_3 and direct electrometric titration of the urine. Production of NH_3 varied considerably in different animals.

Bertrand, G. (1937). L'importance des elements oligosynergiques en biologie. [**Importance of " Trace " Elements in Biology**]. pp. 17. Rome: Istituto di Sanità Pubblica. [8vo] [In French].

B. discusses the subject of " trace " elements generally, and in more detail some of his own work on this subject, in particular, the effect of traces of Mn upon the growth and fructification of *Aspergillus niger*, and of Zn in the nutrition of the mouse and the rat. As the " trace " elements constitute only a small proportion of the structural make-up of plants and animals, their function must be of the nature of catalysts. On this basis, B. puts forward the hypothesis that they have played a significant part in evolution by increasing the number of possible chemical reactions within the cells and consequent elaboration of morphological structure, physiological function and biochemical potentialities. This is summed up by regarding the organism, plant and animal, as kind of oligarchy in which the masses, composed of more passive elements, are governed by a minority consisting of the catalytic elements.—Alfred Eden.

Hove, E., Elvehjem, C. A., & Hart, E. B. (1939). **Boron in Animal Nutrition.** —*Amer. J. Physiol.* **127.** 689-701. 2 figs., 9 tables. [15 refs.] [Authors' summary copied *verbatim*].

1. A colorimetric method for the determination of boron in biological materials has been described. This method is subject to a 10 per cent error between 0·5 and 5 microgram.

2. The milk from 22 cows has been analyzed for boron. There is no significant difference between breeds, nor for different periods of the lactation cycle.

3. It is possible to increase the boron concentration of the milk tenfold in the first 24 hours after feeding 13 grams of boric acid.

4. Normal egg whites contain from 8-10 times more boron than egg yolks. This ratio is not altered significantly when the hens are placed on a high boron ration, although the absolute amounts increase greatly.

5. Boron, fed as boric acid, can pass through the placenta and can pass into the milk of rats. The extent of passage into the milk is somewhat greater than its passage through the placenta.

6. Boric acid fed to rats is eliminated with extreme rapidity.

7. The addition of boron to milk does not produce better growth in young rats. There is some evidence to show that young are better able to survive the nursing period when their mothers are receiving supplements of boron. This point needs further study.

8. The addition of boron to a dry ration which allows only 0·8 microgram of boron per rat per day does not result in better growth. It can be concluded that if boron is needed by the growing rat then this amount of boron per day satisfies that requirement.

I. Polonovski, M., & Briskas, S. (1939). Contribution à l'étude de l'action hémopoiétique du cobalt au cours de l'anémie provoquée chez le jeune rat carencé. [**Haemopoietic Action of Cobalt on Induced Anaemia in Cobalt-Deficient Rats**].—*C. R. Soc. Biol. Paris.* **130.** 1588-1590. [5 refs.]

II. Polonovski, M., & Briskas, S. (1939). Le rôle des sels de cobalt dans les anémies provoquées chez le chien. [**The Role of Cobalt Salts in Induced Canine Anaemia**].—*Ibid.* 1590-1593. 1 fig.

I. Rats were rendered anaemic on an exclusive milk diet and the addition of 1-2 mg. $CoCl_2$ per day led to an increase in the blood Hb and red and white cell counts, accompanied by loss of weight and vitality, and diarrhoea. The authors therefore are in doubt as to whether Co exerts a real direct or indirect haemopoiesis or whether the apparent improvement in the blood picture is due to a concentration of the blood influenced by a disturbance of the water metabolism as evidenced by loss of weight and diarrhoea. [From the data published there is no evidence of a polycythaemia following the Co administration; indeed the Hb and R.B.C. count did not rise to the values at the beginning of the experiment. A similarly induced anaemia, but in much more severe form, was conclusively shown by Elvehjem *et al.* [(1925). *J. biol. Chem.* **65.** 67.] to be due to a Cu deficiency, and beyond showing that the $CoCl_2$ arrested the anaemia (although it did not prevent the rats losing weight and showing diarrhoea) this experiment contributes very little to the knowledge of the physiology of Co. Further, the authors do not appear to be aware of the very extensive Australasian work on Co].

II. A dog fed exclusively on milk, sugar and rice was rendered anaemic by repeated bleedings (the blood plasma being reinjected) until its Hb and R.B.C. count were low and constant, and then 1 and later 2 mg. $CoCl_2$ were given daily. Apart from a slight temporary improvement in the blood picture, the Co caused the dog to show symptoms of inappetence, loss of weight and general dullness. The clinical signs disappeared when $CuSo_4$ was substituted for the Co, without, however, any improvement in the blood picture, and the later substitution of Fe for the Cu had but little beneficial effect. Following this both Fe and Cu were given together and the blood picture rapidly became normal. The polycythaemic effect of Co, the authors conclude, in canine anaemia is but transitory, and the anaemia becomes more intense, in direct contrast to the lasting beneficial effect of the administration of Fe and Cu. [This work bears out the early American work on the importance of the role of Cu in haemopoiesis].—Alfred Eden.

Bonner, W. G., McNaught, K. J., & Paul, G. W. (1939). **Cobalt Topdressing Experiments. Excellent Results in the King Country.**—*N.Z. J. Agric.* **58.** 493-494. 2 tables.

Describes two field experiments which demonstrate the value of top-dressing with cobaltized superphosphate in preventing "bush sickness". The effect of this method in raising the cobalt content of the pasture from an unhealthy to a healthy level persisted for some twelve months. The treatment appears to have prevented the onset of bush sickness.—L. W. N. Fitch.

Grimmett, R. E. R. (1938). **Licks and Their Uses.**—*Proc. Ann. Meet. Sheep Fmrs., N.Z., 1938.* pp. 29-35.

A general paper discussing the mineral requirements of animals, with special reference to New Zealand farming conditions; it contains nothing new.

—L. W. N. Fitch.

Mellanby, E. (1939). **Further Observations on Bone Overgrowth and Nerve Degeneration Produced by Defective Diet.**—*J. Physiol.* **96.** 36P-37P. [5 refs.]

Brief mention is made of bony overgrowths and their pressure effects on the spinal cord, pituitary body, cranial and peripheral nerves in dogs fed on a diet deficient in vitamin A and rich in cereals. No pathological anatomical description of the changes is given.—Whittick.

I. Leskien, J. (1937). Stand der Kenntnisse über die Lecksucht des Rindes. [**Present State of our Knowledge of Pica in Cattle**].—*Forsch.-dienst.* **4.** 542-548. [Numerous refs.]

II. Sjollema, B., Danckwortt, P. W., & Hotzel, J. (1938). Lecksucht und Kupfermangel. [**Pica and Copper Deficiency**].—*Dtsch. tierärztl. Wschr.* **46.** 362.

III. Sjollema, B. (1938). Kupfermangel als Ursache von Tierkrankheiten. [**Copper Deficiency as a Cause of Disease in Animals**].—*Biochem. Z.* **295.** 372-376. [7 refs.]

I. A general article by one of the workers associated with the investigations conducted in Prussia in 1935. Since the disorder is ill-defined and almost any disease associated with perverse appetite has at one time or another been called " lecksucht " (licking disease), L. attempts a brief review of about 46 references, dealing with the occurrence of pica in the course of pregnancy, in disturbance of the digestive tract, in the course of other diseases such as osteomalacia and tuberculosis, in consequence of functional nervous disturbances, and as a result of malnutrition in various forms. Amongst the last named are mentioned adverse acid-base balance of food, imbalance between sodium and potassium, phosphorus deficiency, copper deficiency, and inadequate supply of essential vitamins.

II. A discussion concerning the causes of the ill-defined syndrome termed " lecksucht ". At an earlier date Sjollema [see III] had adduced evidence to show that one form of " lecksucht " in the Netherlands could be controlled by copper therapy. Danckwortt and Hotzel [*V. B.* **9.** 797.] attributed a form observed by them to sodium deficiency in the presence of adequate copper. Sjollema points out that the causes of disorders showing certain symptomatic similarities may be quite different, and compares the pica associated with phosphorus deficiency in South Africa and elsewhere ; he does not dispute the possibility of a sodium deficiency " lecksucht ", but reiterates his advice to apply copper sulphate at the rate of about 100 kg. per hectare in those areas in which copper deficiency is suspected.

III. Cows and goats on certain sandy soils in Holland developed a disease somewhat different from the usual " lecksucht ", and characterized by diarrhoea, loss of appetite and condition, marked reduction of milk yield, and change of black hair colouring to grey-brown. The copper content of the blood, liver, spleen and hair of affected animals was much below normal, blood values being in some cases reduced to one third of the expected figure. Administration of copper sulphate on changes of pasture induced rapid recovery if the disorder was not too advanced. Deficiency of iron appeared to play no rôle. Grass and hay of affected farms were low in copper, zinc and manganese, and normal in lead. Although cereal crops showed evidence of manganese deficiency, no such deficiency was reflected in the tissues of grazing animals. Despite the low copper content of the blood of affected animals, the disease was not characterized by anaemia. Although the possibility remains that the disturbance of copper metabolism is indirect, the author considers that the balance of evidence points to direct nutritional deficiency of that element.

—H. H. Green.

I. Marek, J., Wellmann, O., & Urbányi, L. (1938). Weitere Untersuchungen über Rachitis und Osteomalacie. [**Further Research on Rickets and Osteomalacia**].—*Arch. wiss. prakt. Tierheilk.* **73.** 32-39. 3 tables. [13 refs.]

II. Marek, J., Wellmann, O., & Urbányi, L. (1938). Weitere Untersuchungen über Rachitis und Osteomalacie. II. Mitteilung. [**Research on Rickets and Osteomalacia. II**].—*Ibid.* 73-82. 3 figs., 2 tables.

III. Marek, J., Wellmann, O., & Urbányi, L. (1939). Untersuchungen über Rachitis und verwandte Knochenerkrankungen. III. Mitteilung. Versuche an Hunden. [**Research on Rickets and Allied Bone Diseases. III. Experiments on Dogs**].—*Ibid.* **74.** 421-432. 4 figs., 2 tables.

I. The authors discuss the aetiology and pathology of a naturally occurring case of osteodystrophic disorder in a gravid cow. The three-year-old cow showed mixed lesions of osteoporosis, rickets and osteomalacia, but the skeleton of the seven-month foetus was quite normal. Analysis of the bones of the mother showed much reduced ash content with comparatively normal Ca/P quotient, but with increased CaO/MgO quotient. The disease was attributed to inadequate dietary P_2O_5 (33 g.) in relation to adequate CaO (72 g.) and MgO (46 g.).

II. A case of advanced naturally-occurring osteomalacia in an eight-year-old cow, caused by excessive preponderance of CaO (377 g.) and MgO (157 g.) over adequate P_2O_5 (95 g.) in the ration, the alimentary absorption of P being presumably deprived. Bone analysis showed raised Ca/P quotient.

III. A record of experiments on 13 puppies grouped on rations of varying mineral content. Pathological and biochemical data are given on the resulting osteodystrophic conditions. Rickets was produced on P-deficient and Ca-deficient diets, and also when Ca grossly exceeded adequate P. Considerable excess of P over Ca did not produce rickets, although there was evidence of digestive disturbance. Determination of " alkaline reserve " of blood was of little diagnostic value, but estimates of " buffered state ", by determining the amount of acid or alkali required to shift plasma pH, could apparently be correlated with diet.

—H. H. Green.

Branion, H. D., Stackhouse, J. E., & Hull, H. (1938). **The Rachitogenic Properties of Cereals in Chick Rations.**—*Sci. Agric.* **18.** 447-461. 9 figs., 5 tables. [Numerous refs.]

The introduction of this paper contains 40 references, most of which support the thesis that cereals contain an anti-calcifying factor. The authors' experimental work consisted of feeding various combinations of cereals, with the addition of graded doses of vitamin D in the form of viosterol, to newly hatched chicks over a ten-week period. Besides determining the percentage of ash in the femurs, tibiae and metatarsi of chicks which survived to the tenth week, as a criterion for rachitogenic properties of the various mixtures fed, observations were recorded of growth, mortality and deformed leg development. The authors could find no definite evidence that oats or oat groats contained any anti-calcifying factor in excess of corn, wheat and barley. Viosterol was found inferior to cod liver oil in promoting calcification.—L. M. Heath.

Monceaux, R. H. (1938). Difficulté de transformation du carotène (provitamine A) en vitamine A au cours de nombreux états pathologiques. Conséquences thérapeutiques. [**Difficulty of Transformation of Carotene into Vitamin A in Disease, and its Use in Therapeutics**].—*Pr. méd.* **46.** 1683-1684. [12 refs.]

M. refers to the existing difficulties which are observed to occur in transforming carotene to vitamin A in certain diseased conditions in man, and points out that even in healthy subjects only a small proportion of the carotene administered can be converted and stored. He remarks that in certain human beings the inclusion of carotene-rich food leads to yellow pigmentation of the blood and skin, without, however, the lack of pigmentation of the faeces that occurs in jaundice ; he gives instances in which he has observed this condition, notably in some cases of pulmonary tuberculosis, in certain cancer patients, and in hepatic insufficiency. He attributes the condition to the inability of the blood

to deal with the carotene. He refers to other authors who have observed this condition in other diseases. He suggests that observations on certain hemiptera, showing that the temperature in which they live conditions their depth of colour, may give a clue to this question, namely, that with an increase of physiological activity, and particularly of oxidation reactions, the carotene is more readily dealt with than when the reverse conditions occur.

Opper, L. (1939). **Experimental Vascular Disease in Rats Produced by Multiple Depletions of Vitamin A.**—*Proc. Soc. exp. Biol., N.Y.* **40.** 449-450. [1 ref.]

Twenty-four pairs of rats, litter mates of the same sex and ranging in weight from 50-100 g., were given a basal ration deficient in vitamin A and supplemented only in the control rat of each pair with 3 drops of carotene in oil. Two or three vitamin A depletions, stopped by carotene dosage, were obtained in each rat during an experimental period ranging from 127-238 days. All but three of the multiply-depleted rats showed some degree of vascular injury, but no trace of morphological change was observed in the vessels of any of the 24 control rats. The majority of the involved aortas were characterized by loss of elasticity, dilatation and the presence of firm intramural plaques; the major branches of the aorta revealed marked tortuosity. The histological changes observed are also described.—R. A.

Bischoff, F., & Long, M. Louisa. (1939). **The Relation of the Vitamin B Complex to Tumor Growth.**—*Amer. J. Cancer.* **37.** 54-58. 3 tables. [3 refs.] [Authors' summary copied *verbatim*].

The growth of sarcoma 180 is not significantly influenced by the exogenous supply of tyrosine, tryptophane, vitamins B_1, B_2, or nicotinic acid.

Some specific nutrient in the vitamin B complex (Galen B) appears to affect tumor growth, suspicion resting on B_6 or the filtrate factor.

Vitamins B_1 and B_2 have a profound effect upon the nutritional state as indicated by increase in caloric consumption and somatic growth, but the deficiency which they remedy is not a factor in tumor growth.

Helmer, O. M., & Fouts, P. J. (1938). **Multiple Nature of the Deficiency of Blacktongue-Producing Diets as Shown by Studies on Rats.**—*J. Nutrit.* **16.** 271-277. 1 fig., 1 table. [Numerous refs.] [Authors' summary copied *verbatim*].

1. Blacktongue-producing diets did not contain sufficient riboflavin, chick antidermatitis (filtrate) factor, or nicotinic acid to promote normal growth of rats.

2. Addition of riboflavin to the diet increased the growth rate in one experiment, but not in the others.

3. Rats fed diets supplemented only with nicotinic acid grew less than rats fed unsupplemented diets.

4. Since blacktongue-producing diets are similar to diets of pellagrous patients, these findings suggest that if nicotinic acid alone is added to diets of pellagrins, deficiencies due to other missing components of vitamin G (B_2) complex may develop. It is suggested that treatment of pellagrous patients should include administration of all known components of the complex even though it has been reported that administration of nicotinic acid alone cures pellagra.

Margolis, G., Margolis, L. H., & Smith, Susan G. (1938). **Cure of Experimental Canine Blacktongue with Optimal and Minimal Doses of Nicotinic Acid.**—*J. Nutrit.* **16.** 541-548. 3 figs., 1 table. [Numerous refs.] [Authors' summary copied *verbatim*].

Twenty-six dogs were studied in thirty-five attacks of acute blacktongue in

their response to treatment with nicotinic acid at various dose levels under standardized conditions.

The minimum effective daily dose of nicotinic acid as judged by growth response, storage, prompt return of appetite and disappearance of the classical mouth symptoms was 0·5 mg. per kilogram. Daily doses of 1·0, 1·5 and 10 mg. per kilogram of body weight were equally effective. When the dose was reduced to 0·2 mg. per kilogram daily, the curative response was delayed. The weight remained constant or decreased during the first 5 to 8 days of treatment while the mouth lesions healed, then there was a gradual moderate gain in weight with return of appetite. A dose of 0·1 mg. per kilogram daily was completely ineffective in restoring the appetite and in preventing the loss of weight, but was sufficient to arrest the progress of and partially heal the mouth lesions, at the same time decreasing the rate of the weight loss.

A solution of nicotinic acid autoclaved for 6 hours was just as effective even at the lower levels of 0·2 mg. and 0·5 mg. as was the unautoclaved material.

Sebrell, W. H., Onstott, R. H., Fraser, H. F., & Daft, F. S. (1938). **Nicotinic Acid in the Prevention of Blacktongue of Dogs.**—*J. Nutrit.* **16.** 355-362. 2 tables. [10 refs.] [Authors' summary copied *verbatim*].

1. Recession of acute symptoms of blacktongue followed the administration of either sodium nicotinate or nicotinic acid.

2. The total quantity of nicotinic acid necessary to cause the acute symptoms of blacktongue to subside appears to be from 20 mg. to 60 mg.

3. The wide variation in the amount of nicotinic acid required to prevent recurrence of the acute symptoms of blacktongue suggests that some factor other than body weight may be involved.

4. A semi-weekly dose of 3·0 mg. of nicotinic acid appears to be barely sufficient to prevent blacktongue under the conditions of this experiment. A semi-weekly dose of 10 mg. of nicotinic acid was ample to prevent blacktongue for a period of 6 months.

Stokstad, E. L. R., & Manning, P. D. V. (1938). **The Effect of Riboflavin on the Incidence of Curled Toe Paralysis in Chicks.**—*J. Nutrit.* **16.** 279-283. 2 tables. [6 refs.] [Authors' summary copied *verbatim*].

1. The effect on curled toe paralysis of adding graded amounts of pure riboflavin to a diet low in that factor has been studied.

2. Under the conditions of the experiments, curled toe paralysis did not develop unless small amounts of riboflavin were present. Large amounts of the factor completely prevented the disorder.

Hunt, C. H., Winter, A. R., & Bethke, R. M. (1939). **Further Studies on the Riboflavin Requirements of the Chicken.**—*Poult. Sci.* **18.** 330-336. 6 tables. [14 refs.]

Studies on range-reared White Leghorn pullets and on 40 day-old White Leghorn chicks were conducted to determine the effect of different levels and sources of riboflavine, as supplied by dried skim milk and dehydrated alfalfa leaf meal, on growth, production and reproduction. It was found that the amount of food consumed increased as the amount of riboflavine-carrying ingredients in the ration was increased ; the riboflavine content of the eggs varied directly with the riboflavine content of the rations. The groups of hens which produced eggs of highest riboflavine content also showed the highest hatchability, and the chicks from such eggs had the highest livability when fed a diet deficient in riboflavine.

The hatchability results indicated that approximately 220-230 micrograms of riboflavine per 100 g. of food were required for the production of good hatchable eggs, while the riboflavine requirements for maximum growth in chicks to twelve weeks of age were about 190-200 γ per 100 gm. of food.—R. Allcroft.

Jukes, T. H. (1939). **Experiments with the Filtrate Factor [Vitamin B].**—*J. biol. Chem.* **128.** 35-43. 1 fig., 2 tables. [Numerous refs.]

Results of investigations into the nature and properties of the filtrate factor (chick antidermatitis factor) indicated that the factor may be a comparatively strong organic acid of low molecular weight. It showed marked resistance to bromination and failed to form insoluble metallic compounds in aqueous or alcoholic solutions. Autoclaving yeast or rice bran extract at 120°C. for five hours had a destructive action on the factor, and it was destroyed in alkaline solution at 100°C. but not at room temperature; it was also destroyed by potassium permanganate in acid solution.—R. Allcroft.

Hegsted, D. M., Oleson, J. J., Elvehjem, C. A., & Hart, E. B. (1939). **The "Cartilage Growth Factor" and Vitamin B_6 in the Nutrition of Chicks. [Correspondence].**—*J. biol. Chem.* **130.** 423-424. [8 refs.]

Chicks on a simplified basal diet containing all the known factors failed to grow satisfactorily, and at four weeks of age weighed 80 gm., but when cartilage, kidney, brain, liver, wheat middlings or polished rice were added, the weight increased to 160 gm. This led to the conclusion that a new growth factor was involved and which was designated the "cartilage factor" pending the selection of a more suitable name. If cartilage was added to the basal ration, but yeast omitted, the chicks grew very poorly. The addition of 30 micrograms of vitamin B_6 (Merck) per chick per day produced markedly improved growth suggesting that this vitamin is essential for chicks.—R. Allcroft.

Fouts, P. J., Helmer, O. M., Lepkovsky, S., & Jukes, T. H. (1938). **Production of Microcytic Hypochromic Anemia in Puppies on Synthetic Diet Deficient in Rat Antidermatitis Factor (Vitamin B_6).**—*J. Nutrit.* **16.** 197-207. 2 tables. [Numerous refs.] [Authors' summary copied *verbatim*].

1. Puppies showed normal rate of growth on purified casein diets, supplemented with concentrated vitamin B or thiamine, crystalline riboflavin, liver extract containing the chick antidermatitis (filtrate) factor and nicotinic acid but free from both riboflavin and the rat antidermatitis factor, and rice polish extract containing the rat antidermatitis factor (vitamin B_6) free of the chick antidermatitis factor and riboflavin.

2. Severe microcytic hypochromic anemia developed in the puppies when rat antidermatitis (vitamin B_6) factor was apparently the only missing component of the diet. This anemia was cured by addition to the diet of this missing factor.

3. Blacktongue was produced in the puppies whenever the liver extract containing nicotinic acid and chick antidermatitis (filtrate) factor was absent from the diet.

Telford, Ira R., Emerson, Gladys A., & Evans, H. M. (1939). **Reduced Muscle Creatine in Paralyzed Young E-Low Rats.**—*Proc. Soc. exp. Biol., N.Y.* **41.** 315-318. 1 table. [7 refs.]

Rats suckled by dams that have suffered vitamin E deficiency develop defects in the skeletal muscle and become paralysed, the affected muscles showing extensive

degeneration and low creatine values. On a normal diet there was a subsequent rise to normal creatine values with spontaneous recovery from paralysis. Such muscles showed normal histology.

PAPPENHEIMER, A. M., GOETTSCH, Marianne, & JUNGHERR, E. (1939). **Nutritional Encephalomalacia in Chicks and Certain Related Disorders of Domestic Birds.**—*Bull. Storrs agric. Exp. Sta.* No. 229. pp. 121. 36 figs. on 20 plates, 39 tables, 7 charts. [Numerous refs.]

Data collected over a period of eight years are presented and discussed in this monograph.

It was found that a synthetic diet, containing all the factors known to be necessary for normal rat nutrition except vitamin E, produced in young chicks a severe disorder of the brain for which the term nutritional encephalomalacia is used. The symptoms of the disease, which occurs during the period of active brain growth, and which may be induced in chicks up to the age of approximately two months, are ataxia, tremors, retraction or twisting of the head, clonic spasms of the legs, and stupor which may end in death ; there was no correlation between the incidence of the disease and growth. The essential pathological changes are an ischaemic necrosis of the cerebellum, cerebrum, mid-brain and medulla. Optic lobes, spinal cord and peripheral nerves are not affected and no constant visceral lesions were noted, nor was it accompanied by changes in blood volume or cell plasma ratio, but acute lesions have been associated with increased moisture content of the affected brain tissue. The disease was not transmissible by inoculation and there is no evidence for regarding it as infectious in origin.

A protective factor against the disorder was found to be present in certain edible oils such as corn oil, cotton seed oil, peanut oil and soya bean oil and was concentrated in a stable form from soya bean oil by extraction with 95% alcohol. Preliminary experiments indicate that the chicks are completely protected by α-tocopherol (vitamin E) from vegetable oils and by the synthetic dl-α-tocopherol acetate.

Ducklings did not develop nutritional encephalomalacia upon the same diet, but developed a disease characterized by extreme and progressive myasthenia ending in death within a few days. The pathological changes found in the skeletal muscles were a widespread hyaline necrosis of fibres, with oedema and cellular reaction.

In turkeys the same diet brought about a selective necrosis of the smooth muscle of the gizzard.

Evidence is presented of the spontaneous occurrence of a syndrome closely resembling experimental encephalomalacia and which is at present defined as field encephalomalacia, although the question of aetiologic identity is still an open one because so far it has been impossible to produce the spontaneous disease regularly on suspected natural diets. It is suggested that this spontaneous disorder is due to a borderline deficiency of the same nutritional factor which is definitely lacking in certain simplified diets. Since the preventive factor is fat-soluble and present in the non-saponifiable fraction of certain vegetable oils, it is subject to deterioration and may be lacking in some manufactured feeds, the loss occurring during the process of preparation and storage, but at present no definite recommendations as to preventive measures for field encephalomalacia are made.

Various disorders of young chicks described in the literature under the vague and inclusive title of " leg-weakness " or " paralysis " are described and discussed.

—R. ALLCROFT.

PUBLIC HEALTH

FRÖBERG, K. (1937). Onko maidon erikoiskäsittely luomistauttitartunnan vuoksi Suomessa välttämätön ? [**Necessity for Special Treatment of Milk from Brucella-Infected Herds**].—*Suom. Eläinlääkaril.* **43.** 215-225 and 246-258. 3 tables, 1 map. [18 refs.]

About 3,000 cattle herds were infected with *Br. abortus*. 83 cases of undulant fever were reported between 1932 and 1936. In five of these cases infection was through contact, in seven through milk, in 38 probably through milk, and in three cases probably through contact and through milk. In 30 cases it was not possible to determine the method of infection. 33 of the patients had contact with cattle through either their occupation or their place of residence, but another 31 had no connexion of any kind with cattle. It is stated that it would be difficult to establish general pasteurization of milk in Finland, and F. is of the opinion that there is no need for this procedure.—R. STENIUS (HELSINKI).

JOHNS, C. K. (1939). **Factors Influencing the Reduction of Methylene Blue in Milk.**—*Sci. Agric.* **19.** 435-457. 10 figs., 12 tables. [Numerous refs.]

J. compares the reduction of methylene blue in milk under a wide variety of conditions, including variations of temperatures and dye concentrations, mixing of test samples during incubation, preliminary incubation at 12·8°C., both with and without the addition of dye, and the efficacy of the test under winter conditions. He considers that preliminary incubation improves the test by shortening the reduction time.—L. M. HEATH.

TULLOCH, W. J. (1939). **Observations Concerning Bacillary Food Infection in Dundee During the Period 1923-38.**—*J. Hyg., Camb.* **39.** 324-333. [9 refs.]

Two major epidemics due to *Salmonella enteritidis* var. *dublin* are reported. In one, milk from a cow which had been ill for some days was mixed with that from the remainder of the herd and distributed. 373 cases of infection were traced and of these 269 were fully investigated. Antibodies to *S. enteritidis* were demonstrated in blood sera. The bacillus was isolated from the milk, from the cow at P.M. examination and from the dejecta of cases exhibiting the characteristics of the " paratyphoid-food infection " sub-group of the salmonella organisms. Reaction with anti-*enteritidis* serum showed this to be a true *S. enteritidis* of the Gaertner type.

Strains of both bovine and human origin were retained for future reference and on the introduction of the Kauffman-White classification re-investigation was carried out. The results showed that the causal agent of the outbreak was *S. enteritidis* var. *dublin*. Similar results were obtained in another epidemic involving 100 persons. The source of the infection was shown (as in the first case) to be a cow which had suffered from a septicaemic infection due to that organism.—H. E. BYWATER.

IMPING, E. (1937). Ueber die Veränderung des Zell- und Bakteriengehaltes der Marktmilch durch die meiereimässige Bearbeitung, insbesondere durch die verschiedenen nach der dritten Ausführungsverordnung zum Milchgesetz, zulässigen Erhitzungsverfahren. [**Changes in the Cell and Bacterial Content of Market Milk During Treatment at the Milk Depot, Especially Heat Treatment According to the Provision of the Milk Order**].—*Inaug. Diss., Hanover.* pp. 51. [Numerous refs.]

The author finds that the sediment from milk which has been heat treated

according to any of the provisions of the German milk laws, is richer in cells than that of the same milk when raw.

Milk which has been heated at 80°C. by the flash process has the highest cell content, and that heated by the holder process at 63-65°C. for half an hour the lowest, milk heated by the so called " short process " at 72-74°C. being intermediate.

Flash-processed milk has a high bacterial content, mastitis and milk-souring streptococci being numerous. Holder-processed milk has a relatively low bacterial content, mastitis streptococci being present in insignificant numbers. Milk processed by the short method has the highest bacterial content, mastitis streptococci being numerous. The effect of the heat treatment of cream by the flash or holder methods is also discussed. Full details of the general methods of treatment such as centrifuging are also given.—A. W. Stableforth.

Schwartz, B. (1939). **Zoölogical Problems Relative to Meat Inspection and Their Bearing on Public Health.**—*Amer. J. publ. Hlth.* **29.** 1133-1139. [12 refs.]

Recent investigations on cysticerci in beef and their relation to meat inspection are reviewed. The present work (of which details are not given) showed that the period of retention of carcasses in the cooler for 21 days did not, as was previously accepted, destroy life in all of the parasites, and in consequence the regulations of the Bureau of Animal Industry of the U.S. Dept. of Agriculture were amended to include, as an effective method for the destruction of *Cysticercus bovis*, refrigeration of infected carcasses for not less than six days at a temperature not higher than 15°F.

Investigation of the Zoological Division in co-operation with the Meat Inspection Division showed that the incidence of trichinosis in garbage-fed swine was 4·5-10 % as against 1 % in grain fed swine, and S. considers that pork from garbage-fed swine is the main source of trichinosis in man.—F. T. Boyle.

Röhrer, H., & Stenert, H. (1939). Bact. derby bei einem Schwein als bemerkenswerter Befund bei der bakteriologischen Fleischuntersuchung. [*Salmonella enteritidis* **var.** *derby* **in Swine and Its Importance in Bacteriological Meat Inspection**].—*Z. Fleisch- u. Milchhyg.* **49.** 182-184. 3 tables. [3 refs.]

The authors describe the isolation of a meat-poisoning organism from the liver of a pig slaughtered in emergency. Agglutination with *S. enteritidis*, *S. typhimurium* and *S. paratyphi B* serum was positive. Other sera were not available and the authors sent the culture to the laboratory of the university of Cologne for further examination. There the organism was identified as *S. derby* with the antigenic formula IV fg. It is stated that this organism has been previously isolated only 13 times : eight in human beings and five in pigs. The human strain has the I-antigen, but the animal strain has not. The new case accorded with this differentiation, as it did not possess the I-antigen.—W. F. Benjamin.

Keller, H. (1939). Zur Frage der fleischbeschautechnischen Bewertung der Kopf- und Buglymphknoten des Schweines. [**Importance in Meat Inspection of Head and Shoulder Lymph Nodes in Swine**].—*Z. Fleisch- u. Milchhyg.* **49.** 205-212. 1 fig., 1 table.

A careful examination was made of certain lymph nodes in 50 tuberculous pigs. The frequency with which they were tuberculous was as follows :- mandibular lymph nodes (l.nn.) in 36 cases ; the accessory mandibular l.nn. in 11 cases ; the medial retropharyngeal l.nn. in 16 cases ; the lateral retropharyngeal l.nn. in 8 cases ; the parotid l.nn. in 3 cases ; the ventral superficial cervical l.nn. in

23 cases; the middle superficial cervical l.nn. in 12 cases, and the dorsal superficial cervical l.nn. in 13 cases. [The above figures are the averages for the lymph nodes on both sides. The actual figures for both sides are given].

The significance of these findings is discussed from the point of view of meat inspection.—V. CHLÁDEK (PRAGUE).

RIEVEL. (1939). Können Bakterien in das Ei eindringen? **[Invasion of Eggs by Bacteria]**.—*Tierärztl. Rdsch.* **45.** 377. [Also appeared in *Zbl. Bakt. I. (Ref.).* **133.** 495, and *Berl. Münch. tierärztl. Wschr.* June 30th. 419].

R. refers to pathogenic organisms in eggs capable of causing food poisoning and to non-pathogenic bacteria liable to spoil the keeping quality. Experiments show that the majority of market eggs are sterile. To prove that infection is possible from outside through the intact shell, R. infected the surface of eggs with fluorescent bacteria; after a few days a green discolouration could be observed inside the shell. This could be quickly detected by examining the eggs in ultra-violet light. Humidity and medium temperature (15°C.) favour the penetration of bacteria into eggs.—W. F. BENJAMIN.

ZWANENBURG, T. S. (1937). Over "Salmonella-infectie" in eendeneieren. **[Salmonella Infection in Ducks Eggs]**.—*Thesis, Utrecht.* pp. xii+148. 1 text fig., 4 figs. on 2 plates, 14 tables, 1 graph. [Numerous refs.]

The agglutination test is an important aid in the diagnosis of duck salmonellosis; on farms with a high rate of reacting animals, however, the agglutination test alone cannot be relied upon for the detection of infection for the purposes of control. [This does not agree with the results obtained in Germany and by other workers in the Netherlands, where it has been possible to lower the mortality in young ducks by breeding only from negative reactors]. Z. considers that it is advisable to get rid of animals with titres of 1:200 and higher. [The suggestion that animals with titres under 1:200 are not dangerous is not proved. Z. always heated the sera to be tested; the necessity for this heating has not been proved, and no experiments were done on the presence of normal agglutinins in duck sera, or on the lowering of the titres caused by heating. It is therefore probable that when heated serum was used some birds with titres higher than 1:200 were considered negative, an opinion with which others, *e.g.* in the Netherlands and in England do not agree, as they consider the limit to be 1:25].

Z. considers that the agglutination test on blood should be combined with bacteriological examination of the eggs; in this way he arrives at six groups:– (1) negative agglutination test, bacterially negative eggs; (2) negative agglutination test, bacterially positive eggs; (3) weak agglutination, bacterially negative eggs; (4) weak agglutination, bacterially positive eggs; (5) strong agglutination, bacterially negative eggs, and (6) strong agglutination, bacterially positive eggs. It is advisable to breed only from the first group, but if this is economically impossible on a farm, the third group may be used as well; theoretically, even the fifth group might be used. [Z. bases this conclusion almost entirely on certain negative results without allowing for the fact that these were found in a relatively small number of eggs. Nor does he consider the possibility of a duck's laying at one time healthy, and, later, infected eggs, or, alternatively, that eggs may become infected by the faeces. It is a defect that none of the isolated strains was grown on gelatine, as bacteria are often found, especially in ducks, which have many of the same characteristics as salmonella, but which liquefy gelatin.] Some strains were examined serologically, and were found to be *S. enteritidis* var. *essen*, and *S. typhi-murium*. A further study of the antigenic factors IV and V and of

the fermentation of carbohydrates was not made. [In Holland the rhamnose-negative type is usually found, and both factors IV and V are generally present.] Z. considers that there is a connexion between the blood titre and the occurrence of changed follicles in the ovary; it was usually found that in animals with normal ovaries the titres were not higher than 1:100. This theory is supported by the fact that more salmonella organisms were isolated from the ovaries of ducks with high titres, furthermore it was noted that, in general, those animals with the highest titres laid the greatest proportion of contaminated eggs. [In view of these facts the author's opinion that ducks of group V can be used seems to be contradictory].

Z. suggests controlling duck salmonellosis by means of the agglutination test, hygienic measures and a bacteriological examination of 10 eggs from every duck. [It would not be practicable to deal with the disease in this manner].

—Jac. Jansen (Utrecht).

THERAPEUTICS

Little, R. B. (1939). **The Effect of Sulfanilamide on Bovine Mastitis Streptococci.**—*Cornell Vet.* **29.** 287-294. 2 tables, 2 charts. [17 refs.]

Five cows affected with streptococcal mastitis were treated *per os* with sulphanilamide over periods of 5-17 days, the doses ranging from 12 g. once daily to 512 g. twice daily. The total amounts given per cow varied from 108-1,361 g. Laboratory tests were carried out daily on the fore-milk drawn in the morning and included the determination of the number of leucocytes, the pH and the chloride content, as well as a bacteriological examination. It was found that the drug failed to destroy the streptococci in the affected quarters, the growth of the organisms being retarded only. The number of streptococci and leucocytes were greatly reduced during treatment, however, and L. suggests that sulphanilamide might be of value in alleviating the acute symptoms of the disease. The drug was excreted in the milk for two or three days after treatment was discontinued. L. does not recommend the use of the larger doses for therapeutic purposes.—Hugh N. Spears.

I. Klimmer, M., & Haupt, H. (1938). Zur Behandlung des gelben Galtes. [**The Treatment of Bovine Mastitis**].—*Arch. wiss. prakt. Tierheilk.* **73.** 139-168. 2 tables. [Numerous refs.]

II. Seelemann, M., & Siemonsen, K. (1938). Die Behandlung des gelben Galtes mit Trypaflavin. [**The Treatment of Streptococcal Mastitis with Trypaflavine**].—*Ibid.* 243-251. 2 graphs. [4 refs.]

III. Steck, W. (1938). Die Behandlung des gelben Galtes mit Trypaflavin. Eine Erwiderung auf die gleichnamige Veröffentlichung von Seelemann und Siemonsen. [**The Treatment of Streptococcal Mastitis with Trypaflavine. A Reply to Seelemann and Siemonsen.**—*Arch. wiss prakt. Tierheilk.* **73.** 243].—*Ibid.* 360-361. [12 refs.]

IV. Giebner, O. (1938). Vergleichende Untersuchungen über die Wirksamkeit verschiedener Medikamente auf Galtstreptokokken. [**Comparison of the Efficiency of Various Drugs on Mastitis Streptococci**].—*Ibid.* 374-386. 17 tables. [8 refs.]

I. The authors have made an intensive study of the chronic contagious form of mastitis (*Str. agalactiae* mastitis) in a herd of about 60 milking cows of which originally 70% were infected and which they were unable to free from the disease over the period covered. The study covered a period of over three years and in all 102 cows came under examination, 857 quarter samples being dealt with.

The findings are reported in considerable detail and can only be briefly summarized. The fore quarters were rather more often infected than the hind quarters. Of 49 heifers, 7 showed infection at the first examination. Infection spread rapidly in animals of all ages; details are given of the history of most infections. New infections were found more often towards the end of lactation than earlier. They showed no marked seasonal distribution. More than 54% of the new infections were in only one quarter. Further quarters later became infected, 31% showing infection in one or two quarters respectively, and 19% in three or four respectively. The length of the period of lactation or previous dry period had apparently no influence on new infections. Sixteen quarters of 13 cows recovered spontaneously. There was no evidence of hereditary resistance; in fact most of the evidence was to the contrary. Milk yield was reduced under certain conditions.

Treatment by entozon infusion was made of 254 quarters of 128 cows in lactation, and 66 quarters of 37 dry cows. Freedom from infection at three successive tests covering at least three months was taken as evidence of cure, and two negative tests over two months including a calving as probable evidence of cure. On this basis the results were 31·5% cures, 10·7% probable cures, and 57·8% failures in milking cows, and 47·3% cures, 33·7% probable cures, and 19% failures in dry cows. Many of the successes were in clinical cases.

The authors conclude with a discussion of the importance of the fact, now attested for from several sources, that first calf heifers may show infection shortly after or even before calving. The fact that they occur, necessarily makes eradication much more difficult [even though when they occur, the percentage is usually low]. Further long term studies are required on latent infection, its sources, its relation to subsequent clinical symptoms, and the effect of varying conditions of management, feeding and other factors.

II. The authors have treated 12 cows in lactation and 7 dry cows by means of trypaflavine infusion using the method previously used by them for entozon infusion, *i.e.* briefly, thorough milking out, washing out with the solution to be used for the main infusion; milking out again, moderate filling of the udder and finally thorough stripping after 3-5 minutes. The trypaflavine was used at 0·08 to 0·1 per thousand. They conclude that trypaflavine is not better than entozon, in fact better results are probably obtained with entozon; further, that trypaflavine 0·08 to 0·1 per thousand is more irritant than entozon 1:1250.

They are not satisfied, however, that the present entozon method is the best that can be developed, and promise the results of further studies in the near future.

III. S. replies to Seelemann & Siemonsen. He points out that the method Seelemann has tested and found no better than entozon is his method I, which was successively replaced by method II (with saccharose), and later by method III, in which the trypaflavine concentration is raised to 0·7 per thousand and only a small quantity infused, the so-called " cistern infusion ". He emphasizes the practicability of this method, which has now been used on some 5,000 cows in Switzerland with marked success (75% as against 53% with the old method). He also restates his finding that entozon is much more irritant than trypaflavine, *i.e.* comparing the irritant effect of solutions which have the same bactericidal action *in vivo* and *in vitro*.

IV. G. has studied the bactericidal activity *in vitro* of a number of the preparations most commonly used in the treatment for *Str. agalactiae* infections by udder infusion, *viz.* trypaflavine, entozon and rivanol, together with two other preparations, prontosil and a nitro-acridine derivative recently introduced. The comparison was carried out by mixing 0·25 c.c. of a rich suspension of

Str. agalactiae in various diluents such as broth, milk, mastitis pus, etc., with 0·25 c.c. of a series of dilutions of the bactericidal agents under test, incubating this mixture at 37°C. and plating out a standard loopful in blood agar plates after intervals of 15 and 30 minutes, 1, 2, 4, 8 and 24 hours. The dilutions used were usually 1:100, 1:300, 1:1,000, 1:3,000, 1:10,000 and 1:30,000, controls also being put up. The results were assessed by assigning " mean values " [after the manner of DIERNHOFER (*V. B.* **7.** 267.) for agglutination titres with various brucella suspensions], the mean value being based on the time in minutes taken to reduce the original count to a prearranged extent, due allowance for the time before any effect was noticed and the time taken for complete sterilization also being made.

Prontosil [presumably the original " red prontosil "], had, as expected, practically no action *in vitro*. Trypaflavine showed itself quite definitely the most active preparation.

Comparing the concentrations of trypaflavine and entozon required to produce the same mean value, *i.e.* approximately the same bactericidal action after the same contact time, entozon was one tenth as active as trypaflavine in broth, one thirtieth as active in ox serum, one tenth in mastitis secretion from two different sources containing different amounts of pus, one thirtieth in normal milk and in the secretion of a healthy dry cow, and one tenth to one thirtieth in the secretion of two other mastitis cows, one of which was dry. Rivanol was even weaker in action according to the results obtained.

The nitro-acridine derivative worked as well or better than trypaflavine in certain cases (in serum, the secretion from an acute case of streptococcus mastitis and from a case of coliform mastitis with pure serum-like secretion) but considerably less well in normal milk and less altered secretions.—A. W. STABLEFORTH.

BEHRENS, Eva. (1938). Untersuchungen zur Chemo- und Serotherapie der experimentellen Streptokokkeninfektion. [**Chemo- and Serotherapy of Experimental Streptococcal Infections**].—*Zbl. Bakt. I. (Orig.).* **141.** 385-397. 12 tables. [Numerous refs.]

B. has studied the effect of serotherapy alone, chemotherapy alone, and the two in combination, on a series of white mice injected with varying doses of a strain of type 2 haemolytic streptococcus (Z44) which had been passaged until it killed regularly at a dose of $0{\cdot}5 \times 10^{-7}$. The sera were prepared with this strain before passage and with an unpassageds train of type 3 (Z62). The chemotherapeutic agents were prontosil (0·5 c.c. of a 2·5% solution of the soluble form) or taurolin (0·5 c.c.) intramuscularly.

Both the homologous serum and prontosil alone afforded a high degree of protection whether given before, at the time of, or three hours after the test injection. Neither the heterologous serum nor taurolin gave any significant protection.

The combination of homologous serum and prontosil protected against even larger doses. The combination of heterologous serum and prontosil showed little if any advantage over prontosil alone. The protection afforded by prontosil alone ranged from 1 million M.L.D. when given before or at the time of injection of the test dose to 100,000 M.L.D. when given three hours later. The protection afforded by homologous serum alone ranged from at least 10,000 M.L.D. when given before or at the time of injection to 1,000 M.L.D. when given three hours later. Protection was given by prontosil plus homologous serum against 10 million M.L.D., whether given before, at the time of, or three hours after the test injection.

When further tested against a test dose of 10 M.L.D. it was found that homologous serum would protect when given up to four hours later, prontosil when given up to seven hours later, whilst death was delayed for six days by prontosil

plus homologous serum even when given nine hours after infection, although the mice were obviously ill within three hours.

The probable value of the combination of chemotherapy and serotherapy in the treatment of human infections is discussed.—A. W. Stableforth.

Marshall, E. K., Jr. (1939). **Bacterial Chemotherapy. The Pharmacology of Sulfanilamide.**—*Physiol. Rev.* **19.** 240-269. [Numerous refs.]

The important factor in laboratory tests of sulphanilamide therapy in mice is not the number of L.D. given, but the absolute number of organisms used for infection. Treated mice may die from streptococcus septicaemia a long time after treatment has ceased and without showing any symptoms in the interval. For successful results the drug must be given very early in the infection. In addition to its action on haemolytic streptococci, definite evidence has been presented as to its efficacy in experimental mouse infections due to meningococcus, gonococcus, *Salmonella typhi*, *S. paratyphi B*, the Sonne strain of the dysentery bacillus, *Clostridium welchii*, and a staphylococcus. Some protection against *S. typhimurium*, Friedländer's bacillus, *Pasteurella septica* and some pneumococci has also been obtained. Various other experimental results with the drug are reviewed. The L.D. 50 dose is about 4 g. per kg. With larger doses, especially when given over prolonged periods, various toxic effects may be produced. In acute poisoning it is mainly the central nervous system which is affected. Sulphanilamide is rapidly absorbed and readily diffuses to all tissues and fluids of the body. It is rapidly excreted either in a free form or as a conjugated compound. The investigation of the action of a large number of compounds on different organisms suggests that some compounds are fairly specific in their action, but further work is necessary. The mode of action of the drugs is discussed. The evidence supports the view that direct bacteriostatic and bactericidal actions and a participation of the host are concerned in the activity of these compounds.—J. M. Robson.

Schlossberger, H. (1939). Entwicklung, Wesen und Möglichkeiten der Chemotherapie bakterieller Infektionen. [**Development and Outlook of Chemotherapy of Bacterial Diseases**].—*Zbl. Bakt. I. (Orig.).* **144.** 196*-206*. [Numerous refs.]

There are important differences between the metabolism of micro-organisms and of macro-organisms, which make it possible for certain chemical substances to exert a specific action on the organisms in disease without producing any toxic effects in the host. Both physical and chemical factors play a part in the interaction between the chemotherapeutic substances and the infective agents. One of the difficulties in dealing with bacteria is their high rate of multiplication; bacteria also have great powers of adaptation to the environment. The action of chemotherapeutic substances on protozoa, on bacteria and on viruses (lymphogranuloma inguinale) is a complex one, consisting of several phases in which the host takes an important part.—J. M. Robson.

Domagk, G. (1939). Die Chemotherapie der bakteriellen Infektionen mit Prontosil und seinen Derivaten, unter besonderer Berücksichtigung der Grenzen dieser Therapie. [**Chemotherapy of Bacterial Infection with Prontosil and its Derivatives**].—*Zbl. Bakt. I. (Orig.).* **144.** 206*-223*.

Chemotherapeutic agents produce effects on bacteria which make them susceptible to the action of the natural defensive mechanism of the body. It is probable that, in the case of many substances, the active agent is only set free in the body. The clinical results obtained with prontosil in the treatment of human

puerperal sepsis, erysipelas, streptococcal meningitis and arthritis are reviewed. Uleron and related compounds are said to be more effective in the treatment of staphylococcal, pneumococcal, gonoccoccal and anaerobic bacillary infections. The treatment of pneumonia with the pyridine compound (M & B 693) is also discussed. Animals can be immunized against pneumococcal infections by the previous administration of extracts of pneumococci, but the defensive mechanism thus produced acts on the pneumococci in a different way from that involved in the action of chemotherapeutic agents. The value of these agents is less in the later stages of pneumonia when the alveoli are filled with fibrin and their blood supply is decreased. In the administration of prontosil it is important to use sufficiently large doses straight away and to give the drug at short intervals; if no effect is produced within 3-4 days it is probable that the organism of the patient is not sensitive to the drug.—J. M. Robson.

Boursnell, J. C., Dangerfield, W. G., & Wormall, A. (1939). **Studies on Bayer 205 (Germanin) and Antrypol. III. Further Observations on the Method of Determination and on the Retention of this Drug in the Animal Body.**—*Biochem. J.* **33.** 81-89. 1 fig., 3 tables. [10 refs.] [Abst. from authors' summary].

Further observations have been made on the method of determination of Bayer 205 (or Antrypol) previously described by Dangerfield *et al.* [*V. B.* **8.** 806]. The technique has been simplified by the preparation of coloured discs for a Lovibond comparator. Plasma and serum obtained from blood containing Bayer 205 contain the same amount of the drug.

Investigations carried out have shown that a course of injections of the drug results in a more satisfactory maintenance of a significant amount of Bayer 205 in the plasma over a long period than does a single injection of the same total amount. Some possible reasons for the long retention of the drug in the plasma are tentatively discussed.

A modification of the method has been devised for the determination of small amounts of Bayer 205 in urine.

Spindler, L. A. (1939). **Effect of Ferric Sulphate and Copper Sulphate on Coccidiosis in Lambs.**—*N. Amer. Vet.* **20.** No. 5. 33-38. 1 fig., 1 table. [6 refs.]

Three lambs were given a small daily dose of a weak solution of the two salts over a period of several months, three other lambs serving as controls. Examination of the faeces was carried out twice weekly, and showed that the oocyst content of the treated animals was consistently lower than that of the controls. During the experiment all the animals were artificially infected with nematodes, and no difference was observed between the two groups either in the number of nematode eggs present in the faeces or in the number of nematodes recovered P.M. During the experiment all of the controls had severe attacks of diarrhoea and one died, while in the test group attacks of diarrhoea were mild, and all lived.—W. J. Ironside.

Gunn, J. A. (1939). **The Pharmacological Actions and Therapeutic Uses of Some Compounds Related to Adrenaline. [I & II].**—*Brit. med. J.* July 22nd. 155-160 and July 29th. 214-219. [Numerous refs.]

I. The discovery by Oliver and Schafer (1894) that an extract of suprarenal gland injected into animals caused a swift rise in blood pressure, and the isolation and synthesis of the active principle adrenalin by Dakin and Stoltz (1905), led to the preparation of allied compounds in which the pressor action was more marked

and of longer duration. The mode of action of adrenalin and of homologous compounds, all with the phenylethylamine or the related isopropylamine parent structure, is considered, and accounts are given of their pressor actions, toxicity, actions on the C.N.S. and on involuntary muscle other than cardiovascular. Since the basic molecule is relatively simple, relations between the various derivatives can be readily established, one common action being that on smooth muscle. Some actions are sympathomimetic [resembling the effects produced by stimulation of the sympathetic nervous system to the organ concerned], others are directly on the muscle, and sometimes the actions are mixed, depending on the individual compound. All these substances act on organs supplied with smooth muscle—heart, blood vessels, bronchi, intestinal canal, uterus, spleen, etc.—with a wide range of activity and therapeutic uses. Examples are given showing how alteration of the molecule intensifies or modifies the effects of the resulting compounds.

II. The therapeutic uses of these compounds are considered. The pressor and ecbolic actions, local vasoconstriction, action on the bronchi and involuntary muscle, and effects on the C.N.S. are described in detail, comparison being made between the intensity and duration of the effect produced by the adrenalin group of compounds. The wide potential therapeutic uses of the group are indicated, since there is hardly an organ in the body which may not be influenced to some degree by these substances. Even in the present advanced state of knowledge, G. believes that the potentialities are by no means exhausted and, by means of slight changes of construction in the molecule, various desirable actions can be enhanced and undesirable actions diminished or obviated. Suggestions are made for further research which may lead to the discovery of better remedies than those in use at present.—Alfred Eden.

Csato, T., Wetzler-Ligeti, C., & Wiesner, B. P. (1939). **Effect of the Prolonged Administration of 1:2:5:6-Dibenzanthracene on the Reticulo-Endothelial System of Rabbits.**—*Amer. J. Cancer.* **36.** 257-261. 2 figs., 1 table. [14 refs.] [Authors' summary copied *verbatim*].

Repeated determination of the functional level of the R.E.S. by means of the Congo red method shows that 1:2:5:6-dibenzanthracene tends to reduce the activity of the R.E.S. of rabbits. Lipaemia develops concomitantly with the fall in the Congo red index, and degenerative changes may occur in the ovaries and the thyroid.

Hegyeli, Z. (1938). Adatok a csukamájolajnak és nyers májnak as állatorvosi gyakorlatban való alkalmazásához. [**Experience with Cod Liver Oil and Raw Liver Therapy**].—*Állatorv. Lapok.* **61.** 421-425. 6 figs. on 1 plate, 3 tables. [German version appeared in *Arch. wiss. prakt. Tierheilk.* **74.** 216-227. (1939)].

H. made observations on more than 1,000 pigs used for the production and control of swine fever serum, and made a series of feeding experiments with 12 pigs which were affected with catarrhal pneumonia, enteritis and anaemia. He found that the parenteral administration of large quantities of cod-liver oil, combined with raw liver feeding, resulted in rapid weight increases and the disappearance of pathological symptoms without the adverse reactions attendant on the administration of large quantities of cod-liver oil.

Griffith, H. D., Irving, J. T., & Mason, E. M. (1939). **The Influence of Ingested Radioactive Materials upon the Thyroid Gland of Rats.**—*J. Physiol.* **95.** 516-524. 1 table. [Numerous refs.]

In an attempt to settle the question as to whether radioactivity has any influence

on the aetiology of endemic goitre, experiments were made upon groups of rats receiving adequate and abnormally low I intake with various radioactive substances. In no case were there noticed any thyroid enlargement or any significant differences between those rats receiving radioactive substances and controls, and it is concluded that these substances have no influence upon the thyroid gland. At the very low level of I intake, the I content of the thyroid gland fell also to very low values. Colloid storage no longer occurred and marked hyperplasia was found in the gland itself.—Alfred Eden.

POISONS AND POISONING

Manville, Ira A. (1939). **The Selenium Problem and Its Relationship to Public Health.**—*Amer. J. publ. Hlth.* **29.** 709-719. 1 table. [Numerous refs.]

The history and aetiology of the Se problem is reviewed from the aspect of animal disease, and although so far human Se poisoning has not been reported from the toxic areas, M. calls attention to the possible effects of Se upon public health. A few cases of industrial Se poisoning are known, and a survey of the toxic areas has revealed vague forms of ill-health such as gastro-intestinal disorders, jaundice, rheumatoid and deforming types of arthritis, cardio-renal disease and oedema, dermatitis and skin disorders which may be related to the Se problem. Se disorders may be (1) occupational (2) nutritional, the former including the handling of industrial Se products, such as fruit sprays. The practice of irrigation by Se-containing waters has been shown to lead to the establishment of new seleniferous areas. Care should be taken about food supplies from the toxic areas, with special reference to protein concentrates or derivatives prepared from them. M. calls for further public health studies of the selenium problem in relation to (1) nutritional (2) occupational and (3) irrigation questions.—Alfred Eden.

Motiejunas, J. (1937). Gyvuliu apsinuodijimas cukriniais runkeliais. [**Poisoning of Livestock by Sugar-Beet**].—*Vet. ir Zootech., Kovno.* **14.** 353-356. 1 table. [7 refs.]

M. gives the results of his treatment of sugar-beet poisoning in animals in his district, in which there is a sugar refinery. He employed calcium gluconate, sodium bicarbonate and medicinal charcoal. In 1936, eight out of 23 treated animals were cured, and eight were slaughtered, while no further information was obtainable regarding the other seven. Of the 34 treated by him in 1937, 18 were cured, four were slaughtered, and one died, nothing being known of the others.
—A. Pabijanskas (Kaunas).

PHYSIOLOGY

Trautmann, A., & Asher, T. (1939). Die Resorption von Wasser aus Salzlösungen im Dickdarm der Wiederkäuer. [**Absorption of Water from Salt Solution in the Large Intestine of Ruminants**].—*Dtsch. tierärztl. Wschr.* **47.** 424-426. 2 figs. [8 refs.]

Two goats, both provided with a caecal fistula, were used. Varying concentrations of salt in solution were introduced directly into the large intestines through the caecal canulae and the amount of water absorbed was estimated by the consistency of the faeces excreted after dosage. No attempt was made to determine the water content of the faeces; they were classified simply as pellets, " sausage shaped " or liquid.

It was found that the amount of water absorbed was unaffected by the concentration of the solution introduced, but that it was directly dependent upon the total quantity of salt in solution; in one animal 3 g. of salt had no effect upon the faeces, 4 g. produced " sausage shaped " faeces and 5 g. produced liquid faeces. In the other, 6 g. were needed to produce liquid faeces. It was also found that larger quantities of sodium and magnesium sulphate were required to produce diarrhoea than was the case with salt.—A. T. PHILLIPSON.

NYIREDY, I. (1939). A tej fehérvérsejttartalmának ingadozása egy tejelési időszakban és ennek diagnosztikai jelentősége. [**Fluctuation of White Blood Corpuscle Content of Milk During a Milking Season and Diagnostic Significance Thereof**].—*Állatorv. Lapok.* **62.** 92-95. 2 tables, 3 charts. [3 refs.]

The author examined the milk of 12 cows over a period of 44 weeks to determine whether an increase in the leucocyte content of the milk can be regarded as a reliable indication of the presence of a pathological process in the udder.

He found considerable variations under the influence of various non-pathological factors and concludes that an increase in the number of W.B.C. in the absence of physical, bacteriological and chemical changes does not justify a diagnosis of udder affection or secretive anomaly.

DELAUNE, Elaine. (1939). **Observations on the Bovine Blood Picture in Health and Under Parasitism.**—*Proc. Soc. exp. Biol., N.Y.* **41.** 482-483.

Blood examination of six healthy calves showed an average of 8·7 million red cells and 10,674 white cells per c.mm. and five adults showed an average of 6·39 million R.B.C. and 10,255 W.B.C. per c.mm. A calf fed with larval nodular worms (*Oesophagostomum radiatum*) had after five days a sharp drop in the R.B.C. of 2·5 million and the W.B.C. increased by 5,000 per c.mm. as the result of a 17% increase in the neutrophiles. Similar results were observed in two other calves and also in six calves having a mixed infection of *Bunostomum phlebotomum* and *O. radiatum*. A similar blood picture was noted in a naturally infected heifer. —J. A. GRIFFITHS.

TWISSELMANN, N. M. (1939). **A Study of the Cell Content of the Blood of Normal Chickens, with Special Reference to Comparative Differential Leucocyte Counts Made with Supravital and Wright's Staining Technics.**—*Poult. Sci.* **18.** 151-159. 4 tables, 1 graph. [17 refs.]

Data on the blood counts of chickens, obtained by different workers, show much divergence, presumably due to variations in the technique, and in certain cases only a limited number of observations has been made. T. undertook this study to determine the correct values for the blood cells of healthy chickens. Staining methods are described. Analysis of blood counts of 21 normal chickens was made; the chicks were 47 days old when the examination was started and the blood count was continued for about 7 months at intervals of two weeks. Fluctuations in the cell count values could not be correlated with age. Figures representing total cell content, red and white, and differential leucocyte counts are tabulated.

For differential counts the supravital technique is apparently better than the use of Wright's stain. With Wright's stain indistinguishable forms occur, giving rise to unsatisfactory counts.

In the differential counts the cell type consisted of polynuclears with rods, and polynuclears with granules, basophiles, monocytes and lymphocytes. The data have been analysed statistically.—S. G. IYER.

CANTAROW, A., & HAURY, V. G. (1939). **Diffusion of Calcium, Magnesium and Phosphorus into the Peritoneum. The Effect of Intravenously Injected Calcium Salts and of Parathyroid Hormone.**—*Amer. J. Physiol.* **126.** 66-74. 2 figs., 1 table. [13 refs.] [Authors' summary copied *verbatim*].

1. Calcium and phosphorus equilibrium between the blood plasma and fluid introduced into the peritoneal cavity is reached in 4 to 5 hours and the calcium equilibrium remains constant during the remainder of the 24 hour period.

2. When hypercalcemia is produced and is maintained by the continuous intravenous injection of a diffusible calcium salt, the proportion of diffusible serum calcium, as determined by ultrafiltration, is diminished, tending to return to normal as the serum calcium concentration falls. The calcium content of the ultrafiltrate increases steadily during the period of maintained hypercalcaemia.

3. The increase in the diffusible fraction of serum calcium is followed, after about 30 to 45 minutes, by a progressive increase in the concentration of calcium in the peritoneal fluid, the values for the former and the latter being essentially identical at 1 to 2 hours. During the period of diminishing calcaemia the value for peritoneal fluid falls more slowly than that for the ultrafiltrate calcium.

4. Following the administration of parathyroid hormone, the ratio of peritoneal fluid calcium to serum calcium remains approximately constant for about 5 hours. Subsequently, as the serum calcium falls, this ratio increases, reaching a maximum at the end of the experimental period (7-8 hrs.). The rise and fall in peritoneal fluid calcium lags behind that of the diffusible fraction of serum calcium as determined by ultrafiltration.

5. Under certain conditions the administration of parathyroid hormone may result in hypocalcaemia. A significant increase in the calcium content of the peritoneal fluid (" diffused " calcium) may occur under such circumstances in the presence of a constant or a falling serum calcium concentration. These findings suggest that the fundamental effect of the hormone on the serum calcium is to increase its diffusion from the blood into the interstitial fluid.

ANDERSON, J. (1938). **The Induction of Oestrus in the Ewe.**—*Vet. J.* **94.** 328-334. 2 tables. [12 refs.]

A. gives the results of injecting oestradiol benzoate (" Dimenformon ") into high grade merino ewes in the anoestrus experienced during lactation. In 84 of 113 ewes treated, oestrus occurred within 21 days, the majority within 1-5 days of the injection. The maximum response was obtained with doses of 5,000-6,000 units. Single doses of 2,500 units were found to be as effective as a single dose of 25,000 units. This hormone preparation induced not only a single heat, but also the resumption of the normal oestrus cycle, probably through its effect on the gonadotropic activity of the anterior pituitary.—J. A. G.

SCHRAMM, W. (1938). Die Trächtigkeitsfestellung bei der Stute durch eine biolögische und eine chemische Methode. (Mäuseimpfversuch und Cubonireaktion). [**Pregnancy Diagnosis in Mares by Biological and Chemical Methods. (Mouse-Injection and Cuboni Tests)**].—*Z. InfektKr. Haustiere.* **54.** 57-76. 1 fig., 9 tables. [9 refs.]

The biological mouse test for pregnancy in mares was carried out on large numbers of samples of blood and urine. 979 tests (98%) were found to be correct in mares pregnant 44-145 days. In addition it was possible to diagnose pregnancy correctly in 25 cases (75%) from blood samples taken from mares pregnant 25-44 days and in 21 cases (80%) in mares pregnant over 145 days. At these periods of pregnancy only positive results were found to be significant.

In 113 mares tested by Cuboni's method, nine incorrect results were obtained. Cuboni's method is quicker and cheaper than the mouse test, but it is only reliable after 120 days' pregnancy, by which time there is no difficulty in diagnosing pregnancy by clinical methods. It has the advantage that bacterial contamination of the urine does not interfere with the test, but it proved to be only 94% efficient in comparison with the 98% efficiency of the biological test.—A. T. PHILLIPSON.

PINCUS, G., & WERTHESSEN, N. T. (1938). **An Analysis of the Mechanism of Oestrogenic Activity.**—*Proc. roy. Soc.* Ser. B. **126.** 330-356. 2 figs., 9 tables. [Numerous refs.]

A method of assay for oestrogenic compounds by intraperitoneal injection into ovariectomized mice is described. Comparison with the oestrone standard is made for four types of naturally occurring oestrogens and 29 synthetic compounds. Wide variations in structural configuration (based upon phenanthrene, diphenyl, or naphthalene nuclei) involve roughly similar oestrogenic activities on the basis of vaginal stimulation, with a definite enhancement of activity in the phenanthrene derivatives due to auxiliary hydroxyl groups in the 6 and 7 positions. Certain compounds increase mitotic activity in both the uterine and vaginal epithelium while others stimulate only vaginal mitosis. The simultaneous injection of certain oestrogens with progesterone into rabbits ovariectomized 18-20 hours after mating results in an enhancement of the progesterone effect upon uterine proliferation in the lowest oestrogen doses employed. In higher doses certain compounds (including oestrone) inhibit ovum growth and uterine proliferation; other compounds inhibit only uterine proliferation and enhance ovum growth, while still others enhance uterine growth. It is assumed that these last compounds enter into reactions, the net effect of which is to prevent progesterone destruction. It is concluded that a chain of reactions *in vivo* may be affected by (or permit the participation of) oestrogens, but that some processes, like those leading to ovum growth, are labile to certain compounds, whereas others, like the processes involving vaginal stimulation, are entered into by a great variety of compounds.—J. M. R.

TECHNIQUE AND APPARATUS

STEENKEN, W., Jr., & SMITH, M. M. (1938). **A Medium for the Culture, Isolation and Dissociation of Tubercle Bacilli.**—*Amer. Rev. Tuberc.* **38.** 514-516. [2 refs.]

The authors recommend the following medium, which is a modification of Hohn's :- distilled water 500 c.c., Na_2HPO_4 1·5 g., KH_2PO_4 2 g., $MgSO_4$ 0·3 g., Mg citrate 1·25 g., asparagin 1·5 g. and glycerin 60 c.c. To 50 c.c. of the above stock solution 4·4 c.c. of 1% lacmoid solution is added, followed by 163 c.c. of " whole egg mass ". pH is adjusted to 6·2.—J. E.

MAGATH, T. B. (1939). **Special Syringe for Skin Tests.**—*Amer. J. publ. Hlth.* **29.** 354. 1 fig.

In carrying out successive injections on a series of patients, using a syringe calibrated only in 10ths of a c.c. and changing the needle before each injection, a certain amount of variation occurs between the first dose and those following, owing to the amount of inoculum present in the shank of the needle. M. describes a syringe which, by means of special calibration, eliminates this error, and makes possible accurate administration of each dose.—J. R. LAWSON.

Nabholz, A. (1938). Quantitative Bilirubinbestimmung im Blutserum von Pferd und Rind. [**Quantitative Determination of Bilirubin in the Blood Serum of Horses and Cattle**].—*Inaug. Diss., Zurich.* pp. 39. [Num. refs.]

The bilirubin content of the blood of horses and cattle was estimated by a modification of van den Bergh's method. The limits found in 24 normal horses were 0·55 and 1·55 mg.% ; of these, 17 lay between 0·7 and 1·3 mg.%. These figures agree with the results of other workers. Many sick horses were examined and the bilirubin content of the blood was found to be raised in some cases of pneumonia, colic, tetanus, myoglobinuria and infectious anaemia. No bilirubin was found in the blood of cattle taken from the abattoir ; amounts varying from 0·06-0·87 mg.% were found in the blood of calves.—A. T. Phillipson.

Gordon, H. McL., & Whitlock, H. V. (1939). **A New Technique for Counting Nematode Eggs in Sheep Faeces.**—*J. Coun. sci. industr. Res. Aust.* **12.** 50-52. 1 fig. [1 ref.]

Particulars are given of a technique, the principle of which is a combination of the sampling and flotation methods. Its use reduces the time required for each sample by about one-half (from four minutes to two minutes). A specially prepared slide with three contiguous counting chambers is used, and this is fully described. Such slides can be prepared in the laboratory and may be used repeatedly if simple precautions are exercised in washing them. The accuracy of the method has been checked against the modified Stoll technique used by the authors formerly and a close agreement found.—H. B. Carter.

Kretchmar, H. H. (1939). **The Valve Potentiometer and Its Application to pH Determination.**—*J. Dep. Agric. W. Aust.* **16.** 89-114. 17 figs., 3 tables. [Numerous refs.]

This article collects together data relevant to the design and use of a valve potentiometer for pH determinations.

The article does not lend itself to abstraction and should be consulted in the original.—M. C. Franklin.

MISCELLANEOUS

Ziltener, W. (1938). Abtötung von aeroben und anaeroben Bakterien durch Ultraviolettrstrahlen. [**Destruction of Aerobic and Anaerobic Bacteria by Ultra-Violet Rays**].—*Inaug. Diss., Zurich.* pp. 47. 12 tables. [Num. refs.]

After a short survey of the present state of knowledge regarding the resistance to ultra-violet rays of both aerobic and anaerobic bacteria, Z. gives the results of his own research, in the course of which he found that resistance to these rays is influenced by the wavelength of the light used, by the culture media employed and by the size of the bacteria, probably also by specific peculiarities of the protoplasm.

He found that micro-organisms washed and suspended in physiological saline were less resistant to the effect of ultra-violet rays than bacteria suspended in broth, and that aerobes and facultative anaerobes were more sensitive to ultra-violet rays than obligatory anaerobes. Sensitivity to ultra-violet rays appeared to be in inverse relation to the size of bacteria, *i.e.* the smaller bacteria show less resistance than the larger. Extinction by means of filters of the shortest waves (up to 246 mμ) resulted in a decreased effect and a further more considerable decrease was observed on extinction of further wavelengths up to 277 mμ. Elimination of the wavelengths up to 333 mμ resulted in the almost complete cessation of any bactericidal effect.

DALE, H. (1939). **Biological Standardization.**—*Analyst.* **64.** 554-567. 1 table.

The discovery of important medicinal preparations and substances, of considerable value in aiming at dealing with the causes of disease rather than acting as palliatives, has often considerably preceded the discovery of chemical or physical methods of standardization of these substances. In consequence, recourse has to be made to animals for biological standardization, and subsequent preparations have to be compared with an agreed standard by the observation of various pharmacological effects produced in the animal in each case, the animal merely serving as an indicator in a biological titration. Biological assay is thus comparative and is made in relation to a fixed and invariable standard of reference. Unfortunately animals may give variable results owing to such factors as condition, sex, age and strain. In this connexion it is pointed out that such terms as " minimum lethal dose " have no real meaning unless results are carefully statistically analysed. Various principles of biological standardization are laid down, the most important points being that such standardization, being comparative, gives the best results when standard and unknown are compared on the same animal.

The idea of international standards for such products as these was conceived and developed in 1921, and the history of the standardization of insulin, posterior pituitary hormone and digitalis are fully discussed. This principle of making, keeping, and subsequently utilizing for comparison various known standards, agreed upon by all important countries, apart from any political bias, has worked admirably in practice, and gradually the isolation of active principles in a chemically pure form has made the work of standardization much easier. This has been largely accomplished in the case of several of the vitamins, and the preparation of chemically pure synthetic derivatives of the sex hormones has advanced so rapidly that D. forecasts an early disappearance of biological standardization for these substances and replacement by ordinary dosage in terms of exact weights of pure substances. 31 international biological standards have already been made and the international unit carefully defined. The international distributing centres are Copenhagen for various bacterial antitoxin standards, and Hampstead (London) for vitamins, endocrine secretions and other substances mentioned in the table. Emphasis is placed on the fact that at Hampstead the work of biological standardization has been carried out by research workers as part of their wider research programme, and D. states that this work is often done best by those engaged simultaneously in wide fields of research.—ALFRED EDEN.

OLVER, A. (1938). **Development of Veterinary Work in India.**—*Vet. Rec.* **50.** 999-1005.

This is an account of the Presidential address to the Section of Veterinary Research at the Twenty-fifth Indian Science Congress, 1938. A detailed account is given of the history of veterinary work in India, with details of the existing organization. Emphasis is laid on the need to raise the standard of veterinary education in India and of the facilities necessary for veterinary training.—J. C. W.

DE MELLO, F. de F. P. (1938). Organisation des services vétérinaires au Portugal. **[The Veterinary Service in Portugal].**—*Bol. pec., Lisboa.* **6.** 3-6. [In French].

The central veterinary service consists of three technical departments, each consisting of two sections, and an administrative section. The six sections of the technical departments deal with sanitation, hygiene, breeding, registration of pedigrees, economics and information respectively. The functions of each section are described. The administrative council is composed of the Director

General and two departmental chiefs ; there is also a technical council consisting of the Director General, the Director of the National Zootechnical Station and two veterinary superintendents. There are four central institutions—a central veterinary laboratory, a national zootechnical station, a central aviculture station, and a sanitary station.

In connexion with the regional service there are three breeding stations, three zootechnical stations, two veterinary laboratories, one at Oporto, the other at Evora and 28 superintendents' offices, there being generally one for each administrative district. Some municipal veterinarians are attached to the communes and are paid by them, but they are technically subordinate to superintendents.—H. V. H.

OFFICIAL AND OTHER REPORTS

India, Hyderabad Deccan. (1938). **Annual Administration Report of the Civil Veterinary Department, H.E.H. the Nizam's Government for the year 1346 Fasli (6th October 1936 to 5th October 1937).** [Badami, B. K.] pp. iii +51. 15 tables, 4 graphs, 2 photographs, 2 appendixes. Hyderabad Deccan : Govt. Central Press. [8vo].

India, Assam. (1938). **Annual Report of the Civil Veterinary Department for the year 1937-38.** [Ghose, S. C.] pp. 35+3. 14 tables. Shillong : Assam Govt. Press. [8vo] [Annas 9] [10d.]

India, Baluchistan. (1939). **Report of Veterinary Work for the year 1937-38.** —*Adm. Rep. Baluchistan Agency, 1937-38.* pp. 123-130.

India, Bengal. (1939). **Annual Report of the Civil Veterinary Department and the Bengal Veterinary College for the Year 1937-38.** [Kerr, P. J.] pp. 67. 14 tables. Alipore : Bengal Govt. Press. [8vo].

India, Bihar. (1939). **Annual Report of the Civil Veterinary Department for the year 1937-38.** [Malik, M. I.]—pp. iv +30 +xli +3. 14 tables, 1 map. Patna : Supt. Govt. Printing. [8vo] [Rs. 1-4-0].

India, Bombay. (1938). **Annual Administration Report of the Civil Veterinary Department, Province of Bombay, including the Bombay Veterinary College and the Bombay City and Harbour Veterinary Department, for the year 1937-38.** [Farbrother, E. S., & Deen, M. M.] pp. 52. 12 tables. Bombay : Govt. Central Press.

India, Central Provinces and Berar. (1939). **Annual Report of the Civil Veterinary Department for the year ending the 31st March, 1933.** [McDougall, J. C.] pp. 28. 14 tables. Nagpur : Government Printing [8vo] [Rs. 1-8-0].

India, Mysore. (1939). **Annual Administration Report of the Civil Veterinary Department for the Year 1937-38 with the Government Review Thereon.** [Krishniengar, K.] pp. 19. 11 tables. 3 appendixes. [fcp].

India, Punjab. (1938). **Annual Report of the Civil Veterinary Department for the Year 1937-38.** [Walker, U. W. F.]—pp. ii +45 +xxxiv. 7 plates, numerous tables. Lahore : Govt. Printing. [8vo] [Re. 0-4-0] [5d.]

India, United Provinces. (1938). **Annual Report of the Civil Veterinary Department for the year 1937-38.** [Egan, T. J.] pp. vii+32. Numerous tables. Allahabad : Supt., Printing & Stationery. [8vo] [Annas 4].

I. Department.	II. Total Veterinary Staff	III. Budget (in rupees)	IV. Cattle Diseases (no. of deaths)				
			1	2	3	4	
			Rinderpest	Haemorrhagic Septicaemia	Foot & Mouth Disease	Black Quarter	
Hyderabad-Deccan, 1936-37	100	4,87,740	2,501	2,940	135	1,516	
Assam, 1937-38 ...	66	1,91,677	21,279	2,152	1,499	123	1,
Baluchistan, 1937-38	15	60,062	—	—	109	322	
Bengal, 1937-38 ...	185	Not given	15,178	4,424	1,384	146	1,8
Bihar, 1937-38 ...	153	7,00,695	1,972	2,660	71	365	
Bombay, 1937-38...	138	5,21,971	2,292	1,417	73	970	
Central Provinces & Berar, 1937-38...	162	4,88,257	8,015	6,518	769	4,631	
Mysore, 1937-38 ...	95†	3,30,803	732	828	394	6,193	2,
Punjab, 1937-38 ...	440	23,52,028	16,539‡	13,460‡	569‡	984‡	
United Provinces, 1937-38	237	3,02,770	7,817	3,093	738	327	

‡ Bovines, presumably including buffaloes.
† Veterinary inspectors—total staff not given.

eventive Inoculation of Bovines			VI. Veterinary Work				
2	3	4	Hospitals & Dispensaries				
Haemorrhagic Septicaemia	Black Quarter	Anthrax	1 No. of Hospitals	2 No. of Dispensaries	3 Treatments including supply of medicines	4 Treatments on Tour	5 Castrations
106,952	44,958	6,542	103		285,843	71,687	35,540
for details of methods used		—					
		—					
1,437	—	2,871	3	42 §	7,144	139,618	29,275
183	—	1,359					
—	239	—					
—	2,711	—	—	10	51,677	44,453	603
—	—	—					
—	—	—					
14,602	235	12,130	58		214,337	373,884	13,712
799	219	7,634					
—	—	—					
62,649	12,260	8,162	29	132	123,488	283,271	116,137
13,711	2,813	—					
—	—	—					
25,067	—	1,507	116		241,756	47,803	49,321
6,749	9,313	—					
—	—	—					
10,118	8,712	4,525	104		271,614	629,551	166,129
253,767	63,190	—					
6,970	6,892	—					
32,732	214,612	18,917	75		346,326	53,472	68,673
hods of inoculation not given							
50,420	8,347	600	304	1,216	1,967,142	520,245	664,274
502,679	20,225	—					
—	—	—					
75,892	5,249	7,310	187		568,734	82,366	123,004
47,509	209	—					
—	—	—					

The three figures for each disease in section V represent (1) serum-alone inoculation, (2) vaccine inoculation, and (3) serum-virus inoculation.

Additional Notes

Hyderabad-Deccan

Preventive Inoculations.—Rinderpest :– 11,489 serum-alone, 108,943 tissue vaccine-alone, 7,932 goat virus-alone, 34,242 serum + vaccine, and 9,740 serum + virus. Haemorrhagic Septicaemia and Blackleg inoculations were given by various methods.

Special Investigation.—[Veterinary Investigation Officer, M. R. Mahajan]. A survey for liver fluke infestation was made of 21 villages and 3 hamlets, in which 241 cattle, 248 buffaloes, 90 sheep and 34 goats were examined. The average infestations found were 47 % in cattle, 61 % in buffaloes and 20 % in sheep and goats per village.

Solid immunity to Rinderpest was established for three and a half years after goat virus-alone inoculation, the animals being unaffected when the disease broke out among unprotected animals. Outbreaks of Bovine and Equine Surra were confirmed and variously treated with Naganol, tartar emetic and Bayer 205. *Trypanosoma theileri* was demonstrated in a heifer. Three cases of Nasal Granuloma were confirmed and treated. Other diseases investigated included bovine abortion, sterility, mastitis, three days' sickness, microfilaria in blood of cattle, contagious pleuro-pneumonia in goats, and suspected Ranikhet [Newcastle] disease in pigeons.

Assam

Special Investigation.—[Veterinary Investigation Officer, P. G. Pande]. Diseases studied include stephanofilariasis, kumri, theileriasis in calves, grass poisoning in cattle, septicaemia and coccidiosis in rabbits, Newcastle disease in fowls, pigeon pox, contagious bovine pleuro-pneumonia and septic pneumonia in buffalo calves.

Bengal

Education.—There were 207 veterinary students at the Bengal Veterinary College, and 44 graduated.

Special Investigation.—[Disease Investigation Officer, Sardar Balwant Singh]. The distribution and histopathology of Hump Sore were studied. Experimental treatments were carried out with sodium antimony tartrate. Field testing of the Muktesar spore vaccine for Anthrax was undertaken. *Pasteurella pseudotuberculosis* Type III was found to be the causal organism of Bovine Lymphangitis. Verminous Pneumonia in goats was observed ; the nematode present is *Varestrongylus pneumonicus* [as described by Bhalerao, (*V. B.* **3.** 630.)] and heavy losses are recorded.

Bihar

Education.—There were 81 students in the veterinary course at the Bihar Veterinary College, of whom 17 passed the final examination.

Special Investigation.—[Disease Investigation Officer, L. Sahai]. Research was conducted on rinderpest, Newcastle disease, horn cancer and equine encephalomyelitis. At the veterinary college's research laboratory, Rinderpest virus in goat lymph node tissue was found to be potent on the sixth day of preservation in a thermos flask at 36°-40°F. Newcastle Disease was found to be pathogenic for guinea fowl, although affected birds did not show gaping and respiratory distress.

Bombay

Education.—Of 138 students at the Bombay Veterinary College, 19 graduated during the year.

Special Investigation.—R. N. Naik continued investigations on rinderpest prophylaxis, tuberculosis, and Johne's disease, bovine abortion and tick-borne diseases.

CENTRAL PROVINCES and BERAR

Special Investigation.—[Veterinary Investigation Officer, BACHAN SINGH]. NASAL GRANULOMA was treated with antimosan, and COCCIDIOSIS in cattle with carbon tetrachloride. Experimental immunization against SPIROCHAETOSIS in poultry was carried out with liver emulsions prepared in different ways. RHINOSPORIDIOSIS in bovines was identified for the first time in the province. Observations on HORN CANCER were continued. Research was also conducted on certain blood protozoan and bacterial diseases, parasitic infections in cattle, poultry diseases and trematode parasites of fish.

MYSORE

Special Investigation.—[Veterinary Research Officer, NARAYANASWAMY NAIDU]. Investigations were made on Johne's disease in cattle, gastro-enteritis of the malnad cattle, carcinoma of the nasal sinuses, contagious pleuro-pneumonia in goats, heart-water in imported merino sheep, strangles, and rabies and anti-rabic vaccination of dogs.

PUNJAB

Education.—At the Punjab Veterinary College there were 195 students in the L.V.P. 4-year course, and 10 of these graduated.

Special Investigation.—There is one veterinary investigation officer. Two cases of primary COCCIDIOSIS were recorded in calves. Both were heavily infected with *Eimeria zürnii*, and one showed a few *E. smithi*. Coccidia from animals in the Zoological Gardens, Lahore, were being identified. A new feather mite of domestic fowls was studied.

Some observations were made at the Punjab Veterinary College on albinisms in buffaloes, supernumerary teats in buffaloes, atrophic cirrhosis of the liver and composition of ascitic fluid in a ram, and congenital corneal dermoid in a calf.

UNITED PROVINCES

Special Investigation.—[Veterinary Investigation Officer, H. B. SHAHI]. For sheep and goats, 20-30 c.c. of ordinary ANTI-RINDERPEST serum per animal was found to be necessary in serum + goat tissue vaccine inoculation, to control the severe reaction to the vaccine; in buffaloes, a minimum of 15 c.c. of serum per animal, or of 30-40 c.c. for pregnant and milch buffaloes, must be injected with the vaccine. EQUINE SURRA—most cures were effected with two doses of 4-6 g. of naganol per 1,000 lb. body weight at an interval of a fortnight. A promising preventive treatment is by single and repeated doses of from 1-5 g. per 1,000 lb. body weight. A peculiar condition observed among goats, with high adult mortality and characterized by fever, followed by stiffness and lameness, is to be further investigated. Prophylactic vaccination against SHEEP POX reduced mortality from 90% to 20%. Some cases of HORN CANCER showed squamous cell carcinoma, and one, carcinoma of the adrenal cortex. Necrotic and haemorrhagic foci and signs of marked malignancy were present. A number of cases of BOVINE NASAL GRANULOMA were successfully treated with 15-20 c.c. of 3% tartar emetic solution administered intravenously. Spirochaetosis in poultry and an obscure sheep disease also received attention.

GREAT BRITAIN. (1938). **Thirty-Sixth Annual Report of the Imperial Cancer Research Fund, 1937-1938.** pp. 39. London: Royal College of Surgeons. [4to].

This report includes an account by the Director of the scientific contributions of the staff during the year 1937-38. The various sections deal with carcinogenesis, filterable tumours and viruses, hormones, tissue culture, and radiation, and each

gives a brief summary of the research carried out at the Fund's laboratories, together with references to the contributions of others to the particular problems. The report forms a valuable source of information and serves as an introduction for those who would go deeper into the problem of experimental cancer research.

—E. G. White.

France. (1939). Rapport sur les opérations du service vétérinaire sanitaire de Paris et du département de la Seine pendant l'année 1938. [**Report of the Veterinary Service of Paris and the Department of the Seine, 1938**]. [Chretien, A.] pp. 176. Numerous tables. [13 refs.] Paris : Imprimerie Chaix. [4to].

This report is extremely detailed.

Live Animals in the Seine Department.—There were 11,414 horses, 65 mules, 40 asses, 12 bulls, 3,300 cows, 35 calves, 200 sheep, 70 goats, 4,910 pigs.

Contagious Diseases.—Rinderpest and contagious bovine pleuro-pneumonia do not normally occur, nor were there any cases of anthrax, sheep pox, glanders, swine fever, brucellosis, anaplasmosis, psittacosis or rabies. There were 501 cases of foot and mouth disease and 71 cases of TB.

Meat Inspection.—In addition to the large abattoirs of La Villette and Vaugirard there are eight others in the Department of the Seine. The number of animals inspected was 346,978 cattle ; 288,371 calves ; 1,118,544 sheep and goats ; 633,265 pigs, and 65,672 horses. The total P.M. seizure was 30,190 carcasses, of which 6,981 were tuberculous, 3,532 of these latter being bovine. Out of 22,224,860 kg. of poultry and game dealt with at the central market there were 562 cases of TB.

Laboratory Diagnosis.—1,688 examinations were carried out in the laboratory of the central market. Two new methods were elaborated for the estimation of acetone in meat.

Imported Meats.—1,051,300 kg. were imported, of which 112,946 kg. were seized. 20 examinations for trichinosis were made on imported salted meat, and the results in all cases were negative.

Inspection of Milk.—The number of classified dairy farms was 253, as against 323 in 1929. The total number of cows among classified and unclassified farms was 3,027, and the amount of milk produced daily was 35,780 litres.

France. (1938). Statistiques vétérinaires de l'armée pour l'Intérieur, l'Algérie, la Tunisie, le Maroc et le Levant. " Travail de l'inspection vétérinaire ". [**Veterinary Report of the French Army in France, Algeria, Tunisia, Morocco and the Levant**].—*Rev. vét. milit.* **22.** 5-75. Numerous tables.

A census and age incidence is given and the significance of age and disease is discussed. In France a high mortality occurs from fractures ; in the other countries digestive troubles are more important. The reasons for " casting " in the various countries are compared. An analysis of the losses from strangles is given. Salmonella infection has diminished. Mange is also less, and this improvement is attributable to the use of sulphur chambers and improved sanitation. Particular mention is made of equine infectious anaemia. An analysis is given of the losses from lameness, respiratory diseases, injuries and digestive diseases.

—F. H. Manley.

Levant. (1938). Extrait du rapport sur le fonctionnement du laboratoire de recherches du service vétérinaire des troupes du Levant pendant l'année

1937. **[Report of the Army Veterinary Research Laboratory of the Levant for 1937].** [PIGOURY].—*Rev. vét. milit.* **22.** 92-97. [1 ref.]

One case of ANTHRAX is reported in a local police horse nine months after vaccination. It is considered practicable to vaccinate annually, although immunity wanes after nine months.

CONTAGIOUS AGALACTIA occurs in small ruminants, particularly goats, and mainly during the summer. Symptoms are those of mastitis and, more rarely, chronic arthritis. Cure is spontaneous. The diminished milk yield makes the disease important economically. Citrated joint fluid sent to the laboratory in vials is used for diagnosis ; cultures are grown from the samples, filtered and inoculated into sheep to test their pathogenicity. FOOT AND MOUTH DISEASE is endemic. Five cases of RABIES were confirmed in the cat and one in the dog.

DOURINE is of considerable importance. Blood sera are tested by the formol-gel test and by complement fixation ; the antigen is obtained from a splenectomized infected dog [*V. B.* **8.** 634]. Naganol plus anthiomaline is successfully used against TRYPANOSOMIASIS in dromedaries. The trypanosome is the same as that found in horses. A list is given of PIROPLASMS found in cattle and small ruminants. It is difficult to assess the pathogenicity of individual species owing to frequent mixed infections and absence of clearly defined symptoms. LEISHMANIASIS in the dog is diagnosed by the formol-gel test. RICKETTSIA are found in the conjunctiva of sheep, in which they cause a transient conjunctivitis.

STRONGYLES are the predominant intestinal parasites of horses.—F. H. MANLEY.

INDOCHINA. (1939). Rapport sur le fonctionnement de l'Institut Pasteur de Nhatrang en 1937. **[Report of the Pasteur Institute, Nhatrang for 1937].** [JACOTOT, H.]—*Bull. off. internat. Epiz.* **17.** 746-749.

The staff of the Institute, which concentrates particularly on animal microbiology, comprised three French veterinary officers, two Indochinese veterinary officers, eight Annamite Laboratory assistants and 132 native subordinates.

511,867 doses of anti-rinderpest vaccine and 58,395 doses of antiserum were prepared. 115,898 doses of vaccine and 19,593 doses of antisera for use in various other diseases were also prepared. The use of anti-rinderpest vaccine had again increased, while that of antiserum had remained stationary.

Only about 8,000 doses of a formalized antirabies vaccine were made. The decrease since 1936 is accounted for by the fact that a large number of dogs, having been inoculated with a full dose of this vaccine only two or three years previously, had received since only a small dose annually. A detailed description is given of the preparation of this vaccine from virus of the Pasteur Institute, Paris. There follows a short account of the progress made in its use in Indochina since research concerning it was begun in 1933 in the Nhatrang Institute by order of the Governor General.

ITALY. (1938). Relazione per l'anno 1937, Istituto Zooprofilattico Sperimentale delle tre Venezie. **[Italy, Venezia : Report of the Animal Diseases Institute at Padua for 1937].** [BARDELLI, P.] pp. 35. Padua : Tipografia del Seminario. [4to].

The year's work is reported largely in statistical form with details of diagnosis made and biological products issued. Animal diseases and control measures were the same as elsewhere in southern Europe. Preventive immunization was applied on the largest scale against swine erysipelas and swine fever, and tuberculin was produced in large quantities.

Bovine sterility was given special attention by the staff and 806 animals were examined and treated. Poultry diseases received much attention.

A little research work was carried out. An aromatic mercurial compound (sodium ethylmercuro-mercaptobenzazole 0·4-carbonate) was found to be superior to chemicals like phenol, ether and chinosol as a serum preservative.

An outbreak of bovine malignant catarrh was investigated and a study was made of blackhead.—J. E.

United States of America. (1936). **[Report of] Veterinary Division [U.S. Army, 1936].** [Foster, R. J.]—*Rep. Surg., Gen. U.S. Army, 1936.* pp. 153-194. 1 fig., 8 tables.

The commissioned personnel numbered 123; their distribution is outlined. One veterinary officer was attached to the Medical Research Board at Panama, where investigations were carried out on a disease resembling osteomalacia and on "dhobie itch" of horses, said to be caused by microfilariae.

The examination of all meat, dairy products, tinned foods, etc. for the army is undertaken by the veterinary service; over 4,000 samples were subjected to laboratory tests. The report consists mainly of tabular statistics relating to army animal diseases and to food inspection.—F. J. Andrews.

BOOK REVIEWS

Paraf, J. [Médecin des Hôpitaux de Paris]. (1939). La tuberculose du cobaye. **[Tuberculosis of the G. Pig].** pp. 132. 5 figs., 5 tables. [Numerous refs.] Paris: Masson et Cie. [8vo] [Fr. 30].

P. gives a complete study of TB. in the g. pig, and this work should be of value to all who are interested in this subject.

A preliminary section deals with the general care and management of g. pigs; in the section on P.M. technique is included a detailed description of the lymphatic system. The differentiation of various infections from TB. is described. The methods of infection by the various routes are discussed at some length. The effect of inoculation with the various types of the tubercle bacillus is described in detail, and the results of inoculation of dead or attenuated organisms are indicated. Reinfection of tuberculous g. pigs by different routes is described. Diagnosis of TB. in the g. pig and the vaccination of g. pigs with BCG vaccine are discussed. There is an extensive bibliography.—E. C. Hulse.

Espe, D. L. [Assistant Professor in Dairy Husbandry at Iowa State College]. (1938). **Secretion of Milk.** pp. vi+265. 49 figs., 34 tables. [Numerous refs.] Ames, Iowa: Collegiate Press Inc. [8vo] [$3·00].

The author provides a concise and lucid description of the various factors concerned in the secretion of milk. Part I deals with the phylogenetic development of the mammary gland and the gross anatomy of the udder, together with its vascular, lymphatic and nervous systems, its histology and its development from the foetal stage to lactation and beyond. Part II deals with the theory of milk secretion, the factors affecting the amount and composition of the milk, the nervous and hormonal factors controlling milk secretion, and other miscellaneous factors concerned therewith, such as heredity, anatomical type, methods of milking, etc. Part III deals with the effect of variation in the quality and quantity of the diet in respect to proteins, carbohydrates, fats, minerals and vitamins.

The greater part of the 695 references are American, references to European literature being intentionally avoided where corresponding American ones are available, and use is made of suitable review articles wherever possible.

The book is not intended for the research student, but is based on material used for the author's course in milk secretion at Iowa State College. No attempt is made to discuss controversial questions in any detail but rather to give a clear summary of existing knowledge.—A. W. STABLEFORTH.

DRABBLE, J. [B.V.Sc., Veterinary Officer in Charge of Inspection, New South Wales State Abattoir; Lecturer, Demonstrator, and Co-examiner in Meat Inspection, the Veterinary School, University of Sydney; Lecturer on Meat Inspection, Sydney Technical College]. (1938). **Textbook of Meat Inspection.** pp. xvii+383. 61 figs. Sydney & London: Angus & Robertson Ltd. [2nd Edit.] [8vo] [25s.]

The necessity of a second edition of this book within two years is proof of the value placed on it by those for whom it was intended, *viz*, students preparing for the veterinary degree and lay inspectors preparing for the Meat Inspection Certificate.

Two new chapters have been added, one of which is of value as a guide to students preparing for examinations.

The advice is good and must be very helpful if carefully followed. The whole work shows that the editor writes from a practical as well as a theoretical knowledge, and again we recommend the book as indispensable not only to the students above mentioned but to those who may be called to act temporarily as meat inspectors.
—T. DUNLOP YOUNG.

WALKER, O. J. [Ph.D. (Edin.)]. (1939). **Absorption Spectrophotometry and its Application; Bibliography and Abstracts 1932 to 1938.** pp. 68. London: Adam Hilger Ltd. [8vo].

This little book comprises some 866 references, with very brief abstracts, to original works published from 1932-1938 on the applications of methods of absorption spectrophotometry to numerous branches of chemistry. The author has included every reference that has come to his notice without any attempt at assessing the merits of individual papers. Over one-third of these references is to industrial and analytical chemistry and nearly one half is to papers containing quantitative absorption spectrophotometric data, leaving only 180 references to biochemistry and physiology; these include 25 on vitamins and 36 on physiology and pathology. Thus, very little of the book can be said to be directly concerned with subjects of cognate veterinary interest, and while there is undoubtedly a wide field awaiting exploration on the application of spectrophotometric methods to biological and pathological problems of predominantly chemical concern, the few references so far available are insufficient to make this book of much value to those interested in this particular field.—ALFRED EDEN.

CUMMINS, S. L. [C.B., C.M.G., LL.D., M.D., Director of Research, Welsh National Memorial Association]. (1939). **Primitive Tuberculosis.** pp. viii +213. 1 text fig., 4 plates. [Numerous refs.] London: John Bale Medical Publications, Ltd. [8vo] [10s. 6d.]

This book is about TB. in primitive or uncivilized races and is largely concerned with African peoples. Direct veterinary interest is limited to chapters 17 and 21. Chapter 17 deals with animal TB. capable of infecting human beings. Some veterinary articles originating from Central and West Africa are quoted to show the comparative rarity of bovine TB. in that continent, no record of bovine type infection in man being made. [TB. in livestock has been investigated during recent years in East Africa, at the veterinary research laboratory of the Uganda

Veterinary Department at Entebbe. For recent literature see *V. B.* **6.** 734, **7.** 498, **8.** 335 and 397, **9.** 64]. As references are given in an appendix, the book is useful as a guide to part of the scanty literature on animal TB. in Africa.

In chapter 21, the author discusses the scope for vaccination against TB. quoting *inter alia* from the writings of KOCH, CALMETTE and GUÉRIN, and GRIFFITH and BUXTON. His conclusions seem rather too optimistic, as we know that there is at present no satisfactory method of immunizing cattle against TB.

The book is well and carefully written with due regard to accurate quotations and references. It is also well printed and easy to read.—J. E.

WILLIAMS, R. J. [Ph.D., D.Sc. Professor of Chemistry, Oregon State College]. (1938). **A Textbook of Biochemistry.** pp. x+525. 17 figs., 40 tables. [3 refs.] London : Chapman & Hall Ltd. [8vo] [21s.]

In view of the large number of excellent books on biochemistry and physiological chemistry already available, it is difficult to agree with the statement of the author of this book that there is a demand for a work dealing primarily with animal biochemistry suitable for medical students and others with similar interests. The present volume was, however, written with the principal object of developing " insight on the part of the student into the phenomena of biochemistry " in contrast to " merely collecting together a store-room full of information ", and in his efforts to give a bird's-eye view of the whole biochemical field the author may be excused if his object has been secured at the conscious expense of detailed exposition of the subject matter. He has had to exercise considerable discretion in his selection of material in order to cover the subject within 500 pages. Specific references are given at the end of each chapter, and in the text certain citations of literature, given by author and year only, can be traced by reference to *Chemical Abstracts* or *Index Medicus* for the appropriate year. These references are principally in English and it is gratifying to note that, contrary to the practice of some American authors, a considerable proportion of those referred to are in British and British Empire journals.

The book is divided into five parts. Part I is concerned with the study of basic biochemical materials. Parts II and III deal with the composition of tissues and foods respectively, and contain some exceedingly valuable reference tables. In Part IV are considered the bodily mechanisms for promoting and regulating chemical change, including endocrine and nervous regulation, and control of temperature, permeability, and respiration in its wider aspects. The fifth part, representing two-fifths of the book, deals with metabolism in general, including digestion, absorption, excretion, and intermediate metabolism, and a short chapter on recent compounds of chemotherapeutic interest, including some sulphanilamide derivatives. A short glossary of physiological and medical terms is also included. No gross errors were noticed beyond the normal blood inorganic phosphorus level being given as 20 mg.%.

If one remembers the primary object in the writing of this book, one feels that this object has, to a large extent, been achieved, especially if the reader takes the trouble to consult the references, or look up larger works dealing with the subject matter in greater detail. The student or scientific worker whose interest is not primarily biochemical and yet who desires some knowledge of the breadth of the field, will find the book very useful in place of larger works in which the mass of detail might prove rather overwhelming. The title of this work is somewhat misleading ; the book is not a " textbook " of biochemistry in the general sense of the term, and since the main purpose, openly stated, was to treat the subject perspectively, some indication of this might have been incorporated in the title.—ALFRED EDEN.

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